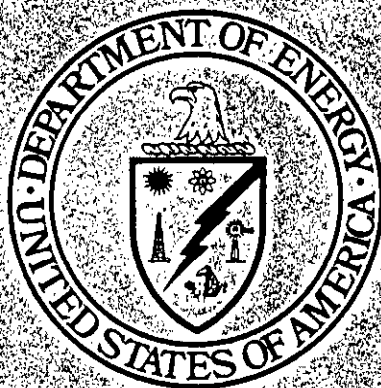


DE-PS01-91FE62271

SOLICITATION NUMBER

Clean Coal Technology IV



DEPARTMENT OF ENERGY
OFFICE OF MANAGEMENT SUPPORT
HEADQUARTERS PROCUREMENT OPERATIONS

OPENING DATE: January 17, 1991

CLOSING DATE: May 17, 1991



Department of Energy
Washington, DC 20585

JUN 17 1991

**PROGRAM OPPORTUNITY NOTICE FOR
CLEAN COAL TECHNOLOGY DEMONSTRATION PROJECTS**

PON NUMBER DE-PS01-91FE62271

Prospective Proposers:

The Clean Coal Technology Demonstration Program is a \$5-billion national commitment, cost-shared by the Government and the private sector, to demonstrate economic and environmentally sound methods for using our Nation's most abundant energy resource. The Program will foster the energy efficient use of the Nation's vast coal resource base. By doing so, the Program will contribute significantly to the long-term energy security of the United States, will further the Nation's objectives for a cleaner environment, and will improve its competitive standing in the international energy market.

The first three Clean Coal Technology solicitations were issued in 1986, 1988, and 1989. This Program Opportunity Notice (PON) is in response to the Clean Coal Technology (CCT) portion of Public Law No. 101-512, "An Act Making Appropriations for the Department of Interior and Related Agencies for the Fiscal Year Ending September 30, 1991, and for Other Purposes." Through this PON, the Department of Energy (DOE) is soliciting proposals for financial assistance required to conduct cost-shared CCT projects to demonstrate innovative, energy efficient, economically competitive technologies that are capable of being commercialized in the 1990's. These technologies must be capable of (1) retrofitting, repowering or replacing existing facilities while achieving significant reductions in the emissions of sulfur dioxide and/or the oxides of nitrogen and/or (2) providing for future energy needs in an environmentally acceptable manner.

On November 20, 1990, a draft PON was issued, and public comments were requested by December 14, 1990. The comments received were carefully reviewed and used in considering modifications to the original draft PON. Accordingly, prospective proposers are advised that the PON enclosed with this cover letter differs in numerous aspects from the draft PON.

The following is a summary of the salient elements of this PON, but not an integral part of the enclosed PON. In the event of any conflict between this PON cover letter and the enclosed PON document, the data and information in the PON shall prevail.

Each project will consist of three phases: (I) Design, (II) Construction, and (III) Operation. The period of performance is to be proposed by the offeror.

PON NUMBER DE-PS01-91FE62271

A Preproposal Conference for this PON will be held on February 5, 1991, at 10:00 a.m., local Washington, D.C., time in the Thomas Jefferson Auditorium, U.S. Department of Agriculture (South Building between the 5th and 6th wings), 14th and Independence Avenue, S.W., Washington, D.C.

Proposals must be submitted in accordance with the instructions in Sections 3 and 5. Each of the four proposal volumes should be bound separately. The proposals must be received at the place designated in Section 3.5, "Time, Date, and Place Proposals Are Due," not later than 4:30 p.m. local time, Washington, D.C., on May 17, 1991.

Only proposals that can satisfy the Qualification Criteria and pass Preliminary Evaluation will be considered for Comprehensive Evaluation. Technical, and Cost and Finance, Evaluation Criteria are provided in Section 4. The program policy factors applicable to this PON are described in Section 4.5.

Depending on the evaluated potential of proposals submitted, one or more Cooperative Agreements may be awarded as a result of this PON.

This PON does not commit the Government to pay any costs incurred in connection with any proposal, to procure or contract for any services, or to provide financial assistance to any proposer. The Government reserves the right, without limitation, to accept or reject any or all proposals regardless of the terms of the original proposal, and to request additional clarifying information, including cost and pricing data. DOE, however, may select a proposal for negotiation without conducting discussions with the proposer.

Proposers are advised that a Clean Coal Technology project selected for financial assistance as a result of this PON will be subject to the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.) and related DOE compliance procedures. Should a proposal be selected, the proposer will be asked to provide information to be used in preparing necessary NEPA documentation. See Section 3.26, "National Environmental Policy Act (NEPA) Strategy," for more information.

All proposers are required to prepare and include in their proposals an abstract of the highlights of their proposed demonstration project, that may be released to the public at any time, in whole or in part. See Section 5.3.1.1, "Public Abstract."

Proposers are cautioned that certain proposal material submitted may become subject to disclosure to the public pursuant to the provisions of the Freedom of Information Act, as amended. See Section 3.27, "Proprietary Data or Confidential Business Information."

The designated Government Representative for this PON is Mr. Herbert D. Watkins. All communications should cite the PON number and be directed to his attention at the address prescribed in Section 3.4, "DOE Issuing Office," or by telephone call to (202) 586-1026.

PON NUMBER DE-PS01-91FE62271

Proposals must remain valid and be authorized for a period of time for acceptance by the Government of not less than 365 calendar days from the date specified above for receipt of proposals. Furthermore, proposers are cautioned that late proposals, modifications, and withdrawals will be treated in accordance with Section 3.34, "Late Proposals, Amendments of Proposals, and Withdrawals of Proposals."

Please complete and return the "Intention to Propose" form provided in Appendix B at the earliest practicable date. No other material should be returned if there is no intent to submit a proposal.

Sincerely,

A handwritten signature in black ink, appearing to read "Ronald E. Cone". The signature is fluid and cursive, with the first name "Ronald" being more prominent and the last name "Cone" following in a similar style.

Ronald E. Cone
Associate Deputy Director
Headquarters Procurement Operations
Office of Procurement, Assistance and
Program Management

Enclosures

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1. DEPARTMENT OBJECTIVE

1.1 INTRODUCTION AND BACKGROUND

On October 23, 1989, Public Law 101-121, "An Act Making Appropriations for the Department of the Interior and Related Agencies for the Fiscal Year Ending September 30, 1990, and for Other Purposes" (the "Act"), was signed into law. This Act, among other things, provides funds to conduct cost-shared Clean Coal Technology (CCT) projects for the design, construction, and operation of facilities that would demonstrate the feasibility of future commercial applications of such "... technologies capable of replacing, retrofitting or repowering existing facilities and shall be subject to all provisos contained under this head in Public Laws 99-190, 100-202 and 100-446 as amended by this Act."

The Act makes available a total of \$600 million for this program. Of these monies, \$7.2 million will be reprogrammed for the Small Business and Innovative Research Program and \$25.0 million will be set aside for Program Direction Funds for costs incurred by the Department of Energy (DOE) for implementation of the CCT IV Program. All of the remaining monies, \$567.8 million, will be available for award under this PON. In addition, pursuant to the provisions of Public Law 101-121 regarding application of unobligated balances of previous Clean Coal Technology appropriations to a solicitation not then issued, it is anticipated that unobligated funds from previous Clean Coal Technology solicitations may be made available for award under this PON.

On May 25, 1990, Public Law 101-302 was signed into law which delayed the issuance of the solicitation for CCT IV from June 1, 1990 until September 1, 1991. Subsequently, Public Law 101-512 was signed into law on November 5, 1990. This Law, among other things, directs DOE to issue a "general request for proposals" for CCT IV by no later than February 1, 1991 and selection of projects for negotiations "no later than eight months after the date of the general request for proposals".

These Laws also specifically address levels and forms of cost-sharing applicable to projects proposed under this PON. See Appendix A, "Congressional Guidance," and Section 7, "Government Financial Participation."

1.2 PON OBJECTIVE

The specific objective of this PON is to solicit proposals to conduct cost shared Clean Coal Technology projects to demonstrate innovative, energy efficient, economically competitive technologies. These technologies must be capable of (1) retrofitting, repowering or replacing existing facilities while achieving significant reductions in the emissions of sulfur dioxide and/or the oxides of nitrogen and/or (2) providing for future energy needs in an environmentally acceptable manner.

2. PROGRAM GUIDELINES

DOE is presenting the following guidelines to assist potential proposers in determining whether a particular technology is eligible for financial assistance under the Fourth Clean Coal Solicitation (CCT IV). These guidelines explain some of the concepts used in the Qualification and Evaluation Criteria presented in Section 4.

1. Technology Eligibility

CCT IV is intended to demonstrate innovative technologies that utilize coal in an environmentally superior manner. It is not intended to support research activities nor to replicate conventional coal utilization technologies.

Candidate technologies must be capable of either retrofitting, repowering or replacing existing facilities and/or providing for future energy needs in an environmentally acceptable manner. Such existing facilities include coal fired power generation and industrial processes which utilize coal. The demonstration projects, however, can be at new facilities provided the commercial application of the technology is capable of retrofitting, repowering or replacing applications and/or providing for future energy needs.

2. DOE's Financial Role

The Act stipulates that DOE's share of total project costs may not exceed 50%. DOE views its financial role as assisting private sector projects. These projects may be conducted by public sector participants (e.g., state or local governments and agencies) or may involve other public sector funding. Title to all real and personal property (other than Government-furnished property) acquired during the demonstration shall vest in the Participant, consistent with the provisions of the Cooperative Agreement.

Further guidance on financial participation is contained in Section 7.

3. Retrofit, Repowering and Replacement Defined

For purposes of this PON, retrofit projects are those which reduce emissions of sulfur dioxide and/or oxides of nitrogen by modifying existing facilities or their present feedstocks or by utilizing new fuel forms (see 4. below).

For purposes of this PON, repowering projects are those which, by replacing a major portion of an existing facility (e.g., a boiler), not only reduce emissions of sulfur dioxide and/or oxides of nitrogen, but also may provide for the use of a new fuel form (see 4. below), increase facility capacity, extend facility life, and/or improve system efficiency.

For purposes of this PON, replacement projects are those used where a decision is made to discontinue certain older facilities (e.g., boiler and power generation turbine) in favor of constructing new and efficient clean coal-powered generating facilities which would employ technologies that, because of their large scale, design, or site specific limitations, may not be suited to retrofitting or repowering existing units. These technologies must comply with the requirements of the Clean Air Act and result in significant emissions reductions, but may also improve system efficiency, increase facility capacity, extend facility life, and/or provide for the use of a new fuel form (see 4. below).

4. New Fuel Forms Defined

For purposes of this PON, DOE considers a new fuel form from coal to be one in which coal has been chemically and/or physically altered with the objective of mitigating emissions of sulfur dioxide and/or oxides of nitrogen.

5. Other Environmental Aspects

Candidate technologies that utilize supplemental fuel other than coal (e.g., oil, natural gas, refuse, etc.) are not precluded under this PON. However, such technologies will not be credited with emission reductions of sulfur dioxide, oxides of nitrogen and/or greenhouse gases for that portion of emission reduction solely attributable to fuel substitution.

3. TERMS, CONDITIONS AND NOTICES TO PROPOSERS

3.1 CONTENT OF RESULTING AGREEMENT

Any successfully completed negotiation concluded under this PON will result in a cost-shared Financial Assistance Award based on the Model Cooperative Agreement provided in Appendix L and a Repayment Agreement based on the Model Repayment Agreement provided in Appendix M.

3.2 PROGRAM OPPORTUNITY NOTICE (PON) NUMBER

DE-PS01-91FE62271

3.3 DATE OF PON ISSUANCE

January 17, 1991

3.4 DOE ISSUING OFFICE

Department of Energy
Office of Placement and Administration
Operations Branch "A-1" (PR-321.1)
Room Number 1I-065
1000 Independence Avenue, S.W.
Washington, D.C. 20585
Point of Contact: Herbert D. Watkins (Procurement Member, Source
Evaluation Board)
Telephone: (202) 586-1026

3.5 TIME, DATE AND PLACE PROPOSALS ARE DUE

Proposals must be received at:

U.S. Department of Energy
Office of Placement and Administration
Office of Management Support
Forrestal Building, Room 1J-005
1000 Independence Avenue, S.W.
Washington, D.C. 20585
ATTN: Document Control Specialist (PR-33)

Proposals must be received NO LATER THAN 4:30 p.m., Washington, D.C. time, on May 17, 1991. (CAUTION: See Section 3.34, "Late Applications, Amendments of Applications, and Withdrawals of Applications.") This PON contains preprinted labels that should be used for mailing or hand delivering proposals.

3.6 AVAILABILITY OF FUNDS

The Government's share of any resulting project costs is subject to the availability of funds appropriated under Pub. L. 101-302, and 99-190. These Acts provide that funds appropriated for this program will remain available until expended. Cost sharing by the Government, however, is contingent upon the continued availability of appropriated funds for this program. Funding to cover the Government's share of allowable costs will be provided on an incremental basis.

3.7 PROPOSAL ACCEPTANCE PERIOD

The minimum proposal acceptance period must be 365 days after the deadline for receipt of proposals, as stated in Section 3.5, "Time, Date, and Place Proposals are Due."

3.8 NUMBER OF AWARDS

DOE anticipates that there will be multiple awards resulting from this solicitation.

3.9 SOLICITATION DEFINITIONS

"Air Toxics" means hazardous air pollutants listed in the Clean Air Act.

"Award" means execution of a Cooperative Agreement between DOE and the Participant as a result of this PON.

"Awardee" means Participant.

"Budget" means the cost expenditure plan by phase submitted in the proposal.

"Budget Period" means the interval of time into which the project is divided for budgeting and funding purposes.

"Clean Air Act" means The Clean Air Act as amended, November 15, 1990 (Public Law 101-549).

"Demonstration Project" means the set of activities described in the Statement of Work of any resulting Cooperative Agreement.

"EHSS" means Environmental, Health, Safety and Socioeconomic.

"Financing Plan" means the information submitted by the proposer that details the source and amount of funds required for the execution of the proposed project.

"Greenhouse Gases" means gases that may contribute to atmospheric warming due to their absorption of infrared radiation, preventing its dissipation into space.

"In-Kind Contribution" means the value of non-cash contribution provided by the Participant or third parties. Examples would be the value of existing property, facilities, equipment, or service to be used in the demonstration project.

"NEPA" means the National Environmental Policy Act (42 U.S.C. 4321 et seq.).

"Participant" means the legal entity that is responsible for all aspects of project performance under the Cooperative Agreement.

"Phase" means the set of related tasks which taken together make up one of the three major categories of work under the Demonstration Project (design, construction, or operation).

"PON" means Program Opportunity Notice.

"Program Income" means the gross income earned directly from any Demonstration Project activity supported with DOE funds during Phases I, II, and III. Such income includes fees for services; fees or rental income for the use of real or personal property acquired with project funds; and income from

the sale of fuel, byproducts; or energy generated by the Demonstration Project. Such income does not include interest on DOE funds; rebates, credits, discounts, refunds, etc. and any interest earned on any of the foregoing; or income from royalties and license fees.

"Project-Specific Variable Operating Costs" means those variable operating costs that are only incurred as a direct result of the Demonstration Project when it is in operation and generating revenue.

"Project Team" means those organizations or parties responsible for proposing and accomplishing all phases of the Demonstration Project.

"Proposal" means the document submitted in response to this Solicitation.

"Proposer" means the organization signing the proposal.

"Selection" means the determination by DOE for certain demonstration projects to proceed into negotiations leading to an award.

"Solicitation" means this Program Opportunity Notice DE-PS01-91FE62271.

"SOW" means Statement of Work.

"Submittal" means proposal.

"United States" means The United States of America and its 50 states, the District of Columbia, the Commonwealth of Puerto Rico, and any possession or trust territory of the United States.

"WBS" means Work Breakdown Structure.

3.10 AN EQUAL RIGHTS NOTE

Wherever, in the PON or Cooperative Agreement, "man," "men," or their related pronouns may appear, either as words or as parts of words (and other than with obvious reference to named, male individuals), they are used for literary purposes and are meant in their generic sense (i.e., to include all humankind - both female and male sexes).

3.11 RESERVED

3.12 INTENTION TO PROPOSE

Please complete the "Intention to Propose" form in Appendix B of this PON and mail it to the address provided on the form by the earliest practical date.

3.13 FALSE STATEMENTS

Proposals must provide full, accurate, and complete information as required by this PON (including all appendices and attachments). The penalties for making false statements in proposals are prescribed in 18 U.S.C. 1001.

3.14 EXPENSES RELATED TO PROPOSER SUBMISSIONS

This PON does not commit the Government to pay any costs incurred in the preparation or submission of any proposal. Such costs include those for studies, designs, or services necessary for the preparation of a proposal.

3.15 AMENDMENTS TO THE PON

The only method by which any term of this PON may be modified is by an express, formal amendment to the PON generated by the issuing office. No other communication made at any scheduled preproposal conference or during discussions,

whether oral or written, will modify or supersede the terms of this PON. Receipt of an amendment to the PON by a proposer must be acknowledged (see Section 3.16, "Acknowledgement of Amendments to the PON").

3.16 ACKNOWLEDGEMENT OF AMENDMENTS TO THE PON

Proposers shall acknowledge receipt of any amendment to this PON (a) by signing and returning the amendment, or (b) by letter or telegram. The Government must receive the acknowledgement before the time and date specified for receipt of proposals.

3.17 PREPROPOSAL CONFERENCE

A Preproposal Conference for this PON will be held on February 5, 1991, at 10:00 a.m. local Washington, D. C. time in the U.S. Department of Agriculture Auditorium. The purpose is to provide an opportunity for prospective proposers to gain a better understanding of the objectives and requirements of this PON. Questions concerning this PON should be submitted in writing to the Source Evaluation Board Procurement Member named in Section 3.4, and should be received no later than January 29, 1991. Seating will be available on a first come, first served basis.

The Preproposal Conference will be held at the following location:

Department of Agriculture
Thomas Jefferson Memorial Auditorium
(South Building - Between 5th & 6th Wings)
14th Street and Independence Avenue, S.W.
Washington, D.C. 20250

3.18 NOTICE OF RIGHT TO REQUEST A PATENT WAIVER

Proposers that are not small businesses or nonprofit organizations have the right to request a waiver of all or any part of the rights of the United States in subject inventions. This request can be made in advance or within 30 days after the effective date of the Cooperative Agreement.

Small businesses and nonprofit organizations need not request a waiver. If the Participant is a small business or a nonprofit organization, the Patent Rights Clause provided in 10 CFR § 600.33(b)(1), [formerly designated § 600.118 (see 53 F.R. 8044 at 8047, Col. 1 (March 11, 1988))] will be included in the Cooperative Agreement. This clause permits the recipient of financial assistance to retain title to subject inventions.

3.19 CLASSIFIED MATERIAL

Performance under the proposed award is not expected to involve access to classified material.

3.20 RESPONSIBLE PROSPECTIVE PARTICIPANTS

- (a) The general and additional minimum standards for responsible prospective Participants set forth in 10 CFR § 600.30 [formerly designated § 600.104 (see 53 F.R. 8044 at 8046, Col. 3 (March 11, 1988))] apply to this PON.
- (b) As authorized by 10 CFR § 600.30 [formerly designated § 600.104 (See F.R. 8044, at 8046, Col. 3 (March 11, 1988))], DOE reserves the right to conduct a preaward review of the proposer's ability to manage and account for Federal funds, or of the proposer's ability to comply with the requirements applicable to a CCT Financial Assistance Award.

3.21 DISCUSSIONS AND SITE VISITS WITH PROPOSERS

No written or oral discussions, or site visits are planned to be conducted with any of the proposers prior to selection for award. Thus, proposers are cautioned to present their most favorable position in their proposal. Although not planned, DOE reserves the right to conduct written or oral discussions, or site visits, with the proposers. If any such discussions or visits are to be held, the proposers will be notified of the date, time and place.

3.22 SELECTION NOTIFICATIONS

Written notice will be provided to both successful and unsuccessful proposers after selection. Information selected projects which have been selected for negotiation will be made publicly available.

3.23 DISPOSITION OF PROPOSALS

Proposals will not be returned unless they are withdrawn in agreement with Section 3.34, "Late Proposals, Amendments of Proposals, and Withdrawals of Proposals."

3.24 DISPOSITION OF PON DOCUMENTS

Drawings, specifications, and other documents supplied by DOE with the PON may be retained by the proposer, except documents that are required to be completed and returned as a part of the proposal.

3.25 PROPOSALS SUBMITTED IN RESPONSE TO THE PREVIOUS CCT PROGRAM OPPORTUNITY NOTICES

This PON is not an extension or duplication of the previous Clean Coal Solicitations: DE-PS01-86FE60966 dated February 17, 1986, DE-PS01-88FE61530 dated February 22, 1988 and DE-PS01-89FE61825 dated May 1, 1989. Proposals submitted in response to the earlier solicitations will not be evaluated or considered in any way with regard to this PON. Prospective proposers are instructed that they must submit a new proposal if they wish to be considered for financial assistance under this PON.

3.26 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) STRATEGY

Consistent with the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Parts 1500-1508) and the DOE requirements for compliance with NEPA (10 CFR Part 1021, 52 FR 47662, December 15, 1987 and SEN-15-90 issued on February 5, 1990), an overall strategy for compliance with the National

Environmental Policy Act of 1969 has been developed for the Clean Coal Technology Demonstration Program. This strategy includes the preparation of a Programmatic Environmental Impact Statement and project-specific environmental reviews before projects are selected, followed by site-specific environmental impact analyses of each proposed project after DOE selection.

No action taken by DOE with regard to any proposal prior to the completion of the site-specific analysis, including project selection or award of a Cooperative Agreement, shall be a final decision for purposes of compliance with NEPA (see Section 6.2).

3.26.1 Programmatic Environmental Impact Statement

DOE has prepared a Programmatic Environmental Impact Statement (PEIS) for this and previous solicitations for the Clean Coal Technology Program. The direct action under consideration in the PEIS is the selection of one or more projects to demonstrate Clean Coal Technologies. The indirect effect of this program is the expected widespread commercialization by the private sector of successfully demonstrated Clean Coal Technologies. The potential environmental consequences of widespread commercialization of these technologies by the year 2010 are analyzed in the final PEIS (DOE/EIS-0146) that was issued by DOE in November 1989.

3.26.2 Pre-Selection Project-Specific Environmental Review

For proposals that undergo comprehensive evaluation, DOE will prepare pre-selection project specific environmental reviews. Such reviews will summarize the strengths and weaknesses of each proposal as compared with the environmental evaluation criteria (See Section 5.3.5), and will include, to the maximum extent possible, a discussion of alternative sites and processes reasonably available to the proposer, a brief discussion of the environmental impacts of each proposal, necessary mitigative measures and, to the extent known, a list of permits and licenses which must be obtained in implementing the proposal. These confidential environmental reviews will be provided to the Source Selection Official for use in the selection process. In addition, DOE will document the

consideration given to environmental factors in a publicly available selection statement. This selection statement will record that the relevant environmental consequences of reasonable alternatives have been evaluated in the selection process, and will be filed with the Environmental Protection Agency, in accordance with the DOE NEPA requirements.

3.26.3 Post-Selection NEPA Review

Each proposal submitted will contain a projected schedule for achieving NEPA compliance for the project based on the expected level of NEPA documentation required and the full time required for its completion. Soon after selection, proposers will be requested to submit the environmental information specified in Appendix J, "Information Requirements for the National Environmental Policy Act." This detailed site- and project-specific information will be used as the basis for site-specific NEPA documents prepared by DOE for each selected project. Such NEPA documents shall be prepared, considered, and published in full conformance with the requirements of the CEQ regulations, 10 CFR Part 1021 and SEN-15-90. Proposers, at their own risk, may choose to begin preparation of the environmental information volume early so that project delays can be avoided. See Section 7.2, "Allowable Preaward Costs for Cost Sharing."

3.26.4 Post-Award Environmental Monitoring Review

In addition to the requirements discussed in Section 3.26.3, each Cooperative Agreement entered into will require an Environmental Monitoring Plan (EMP). Guidelines for development of the EMP are provided in Appendix N to the PON.

The EMP will detail the collection and dissemination of significant technology-, project-, and site-specific environmental data. Besides the data required for compliance with applicable regulations and permits obtained from local, state, and other federal agencies, there may be a need for additional monitoring to verify the performance of mitigative measures. The proposer may also be required to prepare an Action Plan that outlines how the proposer will

implement, during the term of the Cooperative Agreement, commitments made in the site-specific NEPA documents for measures to mitigate expected environmental impacts of the project. Annual reports may also be required by DOE regarding progress made in implementing the Action Plan and fulfilling the mitigation proposed. For convenience, the Action Plan, if required, and the Environmental Monitoring Plan can be combined into one document, and environmental data on performance can be combined with the annual report submitted under the Action Plan required for NEPA compliance. Environmental data on performance of the technology also will be collected to provide a basis for assessing and mitigating the impacts of future commercialization of the technology. The environmental impacts of operation of the facility after completion of the Cooperative Agreement (including disposition of the facility) will be considered to the extent required by DOE's responsibilities under NEPA.

3.27 PROPRIETARY DATA OR CONFIDENTIAL BUSINESS INFORMATION

DOE may be required or authorized to withhold from public disclosure portions of the proposal which contain trade secrets and privileged or confidential commercial or financial information, provided such portions of the proposal have been identified as indicated in the following instructions.

The proposer must identify each proposal page (including each line or paragraph) containing data that the proposer would like withheld from public disclosure. The cover sheet of the proposal must contain the following notice:

NOTICE

The data contained on pages ____ of this proposal have been submitted in confidence and contain trade secrets or privileged or confidential commercial and financial information and such data may be used or disclosed only for evaluation purposes provided that if a Cooperative Agreement is awarded to this proposer as a result of or in connection with the submission of this proposal, the Government shall have the right to use or disclose data herein to the extent provided in the Cooperative Agreement. This restriction

does not limit the Government's right to use or disclose data obtained without restriction from any source, including the proposer.

The proposer must mark every sheet that contains data that it wishes to restrict with the following legend:

"Use or disclosure of the proposal data in lines specifically identified by asterisk (*) are subject to the restriction on the cover sheet of this proposal."

If there is a request under the Freedom of Information Act (5 U.S.C. § 552) (FOIA) for any data contained in a proposal, DOE's response to the request will be made by following procedures set forth in 10 CFR § 1004.11 (1984). After receiving a FOIA request, DOE may ask the proposer to explain why it believes the requested information should be withheld. The proposer's prompt cooperation will ensure that DOE makes a fully informed and justifiable decision on the FOIA request.

3.28 PREPARATION OF PROPOSALS

- (a) Proposers must examine the entire contents of this PON, including all instructions. The proposer assumes the risk of failure to comply with the provisions of this PON.
- (b) Each proposer shall furnish the information required by this PON.
- (c) The proposal must be signed by a responsible official of the proposing organization authorized to contractually bind the organization to the performance of the Cooperative Agreement in its entirety.

3.29 PROPOSAL STRUCTURE

DOE expects that proposals will conform to the PON provision entitled "Proposal Delivery Information" (Section 3.32) and will be prepared in agreement with the instructions provided below. To aid in evaluation, proposals should be clearly

and concisely written, as well as being neat, indexed (cross-indexed as appropriate), and logically assembled. The proposal should be typed, double spaced, unreduced in size, on 8.5" by 11" paper. Illustrations should be legible, foldouts should, in general, be held to 11" by 17" size. All pages of each part shall be appropriately numbered, and each part shall contain the name of the proposer, the date, and the PON number. Each of the volumes shall employ the cover sheets as described below in Section 3.30. Each proposal shall be in four volumes:

ORGANIZATION OF PROPOSAL VOLUMES

- Volume I: Qualification Proposal; See Section 5.1,
"Preparation of Qualification Proposal (Volume I)"
- Volume II: Demonstration Project Proposal; See Section 5.3,
"Preparation of Demonstration Project Proposal (Volume II)"
- Volume III: Commercial Concept Proposal; See Section 5.4,
"Preparation of Commercial Concept Proposal (Volume III)"
- Volume IV: Cost and Finance Proposal; See Section 5.5,
"Preparation of Cost and Finance Proposal (Volume IV)"

3.30 COVER SHEET INSTRUCTIONS

Appendix C of this PON provides four forms that shall be used for the preparation of the cover sheets for the four Volumes identified in Section 3.29. Proposers must complete the forms using the following instructions and then photocopy those four forms for use as (or on) the covers for all copies of each of the four Volumes.

Instructions for all four of the forms are provided below:

- (1) Copy Number. Each submittal shall be provided in one original and 14 copies. In this space, indicate the copy number of the particular Volume, using Number 1 for the original and Numbers 2 through 15 for the copies.
- (2) Technology. Identify the Clean Coal Technology(ies) employed in the project.
- (3) Title. Provide the full title of the submittal. The title should reflect the substance of the proposed project.
- (4) Name(s). Identify the name(s) of the proposer(s), listing the proposed Participant first (see Section 3.9, "Solicitation Definitions").
- (5) Proprietary Information. See Section 3.27, "Proprietary Data or Confidential Business Information".

3.31 PROPOSAL PACKAGING

Each of the proposal volumes shall be physically separate and entitled as listed below. Fifteen (15) copies are required of each proposal volume (original, to be identified as "Copy 1," plus fourteen (14) copies, to be identified as "Copies 2 through 15"). The required packaging and grouping are:

- o Package 1: Copy 1 of Volume I, Qualification Proposal,
 - + Copy 1 of Volume II, Demonstration Project Proposal,
 - + Copy 1 of Volume III, Commercial Concept Proposal,
 - + Copy 1 of Volume IV, Cost and Finance Proposal,
 - + One Unbound Copy of the Public Abstract
(Section 5.3.1.1),
 - + One Unbound Copy of the Project Summary Form
(Section 5.3.1.2).

- o Package 2: Copies 2 through 15 of Volume I,
Qualification Proposal.
- o Package 3: Copies 2 through 15 of Volume II,
Demonstration Project Proposal.
- o Package 4: Copies 2 through 15 of Volume III,
Commercial Concept Proposal.
- o Package 5: Copies 2 through 15 of Volume IV,
Cost and Finance Proposal.

Note: All documents that contain original signatures must be in Package 1.

Each group shown above must be packaged individually. This does not prevent assembling more than one, or all, of the groups in a single package. Mark the group number on the outside of each package. External markings for each group and the place for submission are indicated on the attached labels. As stated in Section 3.32, "Proposal Delivery Information," the proposer must provide the information required on the labels, including its return address.

3.32 PROPOSAL DELIVERY INFORMATION

(a) Signed Originals

Group No. 1 of the proposal, as explained in Section 3.31, "Proposal Packaging," shall contain the signed originals of all documents requiring signature by the proposer. Subsequent copies of the proposal may use reproductions of the signed originals.

(b) Proposal Delivery

The proposer assumes full responsibility for ensuring that DOE receives the proposal by the date and time specified in Section 3.5, "Time, Date, and Place Proposals are Due." If not sent by the U.S. mail, proposals must be closed and sealed as if for mailing. See also Section 3.34, "Late Proposals, Amendments of Proposals, and Withdrawals of Proposals."

(c) Labels

The labels which immediately follow the PON cover page are for the proposer's use when submitting the proposal and amendments thereto. The packages used to submit the proposal (and any amendments thereto) should be marked as shown on the attached labels. The proposer must complete the blanks on the labels for the PON Number, the closing time and date, and a return address. Note that one label should be used if the proposal is hand-delivered and a different label should be used if the proposal is mailed.

(d) Telegraphic Proposals

Telegraphic proposals will not be allowed. Proposals may be modified, however, by written or telegraphic notice, if received by the time specified for receipt of proposals.

3.33 UNNECESSARILY ELABORATE PROPOSALS

Unnecessarily elaborate proposals or other presentations are not desired. They may be construed as a sign of the proposer's lack of cost consciousness. Elaborate art work, expensive paper and bindings, and expensive visual and other presentation aids are neither necessary nor desired.

3.34 LATE PROPOSALS, AMENDMENTS OF PROPOSALS, AND WITHDRAWALS OF PROPOSALS

- (a) Any proposal received after the exact time and date specified for receipt will not be considered unless it is received before selection is made and it:
 - i. was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of proposals (e.g., a proposal submitted in response to a solicitation requiring receipt of proposals by the 18th of the month must have been mailed by the 13th);

- ii. was sent by mail and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation; or
 - iii. is the only proposal received.
- (b) Any modification of a proposal, unless requested by DOE, is subject to the same conditions as in subparagraphs (a)(i) and (ii) above.
- (c) The only acceptable evidence to establish the date of mailing of a late proposal or modification sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark on the wrapper or on the original receipt from the U.S. or Canadian Postal Service. If neither postmark shows a legible date, the proposal, quotation, or modification shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, proposers should request the postal clerks to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.
- (d) The only acceptable evidence to establish the time of receipt at the Government installation is the time/date stamp of that installation on the proposal wrapper or other documentary evidence of receipt maintained by the installation.
- (e) Notwithstanding paragraph (a) above, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.
- (f) Proposals may be withdrawn by written notice or telegram (including mailgram) received at any time before award. Proposals may be withdrawn in person by a proposer or an authorized representative, if the representative's identity is made known and the representative signs a receipt for the proposal before award.

3.35 EXPLANATION TO PROSPECTIVE PROPOSERS

A prospective proposer who would like an explanation or interpretation of this PON must submit a written request to the Source Evaluation Board Procurement Member. Allow enough time for the reply to reach all prospective proposers before the submission of their proposals. To be sure that requests for explanation or interpretation will be considered, the requests must be received by the Source Evaluation Board Procurement Member by 4:30 p.m., Washington, D.C., time, on April 23, 1991. Oral explanations or instructions provided before selection are not binding. Any information given to a prospective proposer about this PON will be furnished promptly to all other prospective proposers, if that information is necessary in submitting proposals or if the lack of it would be prejudicial to any other prospective proposers.

3.36 FAILURE TO SUBMIT PROPOSAL

Recipients of this PON who choose not to submit a proposal should not return this PON. They should indicate, however, by letter or postcard to the Source Evaluation Board Procurement Member whether they want to receive future solicitations for similar financial assistance opportunities. If a recipient does not submit a proposal and does not say if future solicitations are desired, the recipient's name may be removed from the applicable mailing list. Accordingly, it is essential that recipients complete and return the "Intention to Propose" form provided in Appendix B.

3.37 SELECTION OF PROPOSALS

- (a) The Government intends to award financial assistance through cost-shared Cooperative Agreements. These awards will be made to those whose proposals are selected following consideration of the evaluation criteria and program policy factors.

- (b) The Government may (1) reject any or all proposals, (2) select for negotiation any proposal, in whole or in part, and (3) waive informalities and minor irregularities in proposals received.
- (c) The Government may select proposals for negotiation based on the initial proposals received, without discussions with the proposers. Therefore, each initial proposal should contain the proposer's best possible terms from technical, cost, and business and management standpoints.
- (d) Unless a written notice withdrawing the proposal has been received, the Government may select a proposal for negotiations and may make an award of financial assistance during the proposal acceptance period (see Section 3.7).

3.38 FUNDS TRANSFER

Payments by DOE to the Participant under any Financial Assistance Award will be in accordance with U.S. Department of Treasury regulations.

3.39 RIGHTS IN TECHNICAL DATA

The Cooperative Agreement which will be negotiated with successful proposers will present DOE's known requirements for technical data. The Additional Technical Data Requirements clause (see Appendix L, "Model Cooperative Agreement") provides the Government with the option to order additional technical data, the requirements for which are not known at the time of agreement. There is, however, a built-in limitation on the kinds of technical data that may be required. This limitation clause provides that the Participant may withhold delivery of proprietary data. This withholding of proprietary data is the primary means by which the Participant may protect its proprietary position. There are, however, two situations where the Government may need to have limited access to a Participant's proprietary data.

First, paragraph (f) of the Rights in Technical Data clause (see Appendix L, "Model Cooperative Agreement") gives the Contracting Officer's representatives the limited right to inspect, at the Participant's facility, the Participant's

proprietary data which were withheld from delivery. This inspection is needed to verify that such data were properly withheld or to evaluate work performance.

Second, paragraph (g) of the Rights in Technical Data clause provides the Government the right to require the Participant to furnish, with limited rights, proprietary data previously withheld. In this case, the limited rights in proprietary data and the Government's obligation for limited use and disclosure of such data provide the means by which the Participant protects its proprietary position. Paragraph (g) will be used where, for programmatic reasons, there is a need for the delivery of proprietary data to the Government. To help in making this programmatic determination, the proposal must state that the work to be performed and the known requirements for technical data as presented in this PON have been reviewed by the proposer. Furthermore, as discussed in Section 5.3, the proposer must exercise one of two options. First, it may state that no data will be withheld. Second, the proposer may submit a list identifying the proprietary data that, to the best of the proposer's knowledge, likely will be used, acquired, or otherwise obtained during project performance and will be withheld.

Paragraph (c)(3) of the Rights in Technical Data clause, regarding licensing of copyrighted material, paragraph (h), Participant Licensing, and paragraph (j), *Commercialization of Technology*, shall not normally be included where the Participant is a small business firm or nonprofit organization. "However, in such cases, DOE may require the Participant to obtain sufficient obligations from the third parties to ensure commercialization of the demonstrated technology." For Participants other than small business firms or nonprofit organizations, paragraph (h), modified as necessary by programmatic needs, will be included, and paragraphs (j) and (c)(3) may be included, as determined by programmatic needs to ensure commercialization of the demonstrated technology. Paragraph (i), Availability of Contract and Other Data, will normally be included to provide the Government with rights in data in the event of Participant or Government withdrawal. Paragraph (i), however, may be modified as necessary for the programmatic needs for a particular project. Similarly, paragraph (n) of the "Patent Rights" clause ("Facility Patent License") may be modified as necessary in accordance with programmatic needs.

Attention is invited to a new data provision recently authorized by statute that allows DOE to provide, in a Clean Coal Technology Project Cooperative Agreement, appropriate protections against the public dissemination of information that results from the demonstration activities. This protection is authorized for information that would be a trade secret or commercial or financial information that is privileged or confidential if the information had been obtained from and first produced by a non-Federal party participating in a Clean Coal Technology project. This protection against public dissemination of such information is authorized for a period of up to five years after completion of the operations phase of a Cooperative Agreement. The exercise of this authority will not be interpreted by the Department as a substitute for existing authority to grant advance patent waivers or to protect from public disclosure proprietary information.

However, in order to meet programmatic requirements of the Clean Coal Technology Program, some technical data needs to be made available to the public without restriction. It is expected that a Cooperative Agreement will include express provisions assuring the public availability of certain data. However, proprietary data will not be made publicly available.

The period for protection against public dissemination of information resulting from demonstration activities will be negotiable (up to five years after completion of the operations phase) depending on the subject matter and nature of the Cooperative Agreement and the extent to which a participant expressly agrees in the Cooperative Agreement to have appropriate types of data publicly available.

3.40 REPORTS TO CONGRESS

After selection, DOE will prepare and submit to Congress the following reports:

- (1) A comprehensive report on the proposals received and

- (2) A full and comprehensive report on each project selected will be submitted to Congress at least 30 calendar days before the planned execution of any Cooperative Agreement. This report will include the facts and circumstances relied upon in support of the proposed project. Each report will include an analysis describing the environmental impacts that may be produced from the projected commercial application of the generic technology representing the proposer's technology. The report will focus on the projected effects in the year 2010.

3.41 CERTIFICATIONS

Complete the certifications in Appendix H, ASSURANCES - NON-CONSTRUCTION PROGRAMS; CERTIFICATION REGARDING DRUG-FREE WORKPLACE REQUIREMENTS; Certification Regarding Debarment, Suspension, and Other Responsibility Matters Primary Covered Transactions; and DISCLOSURE OF LOBBYING ACTIVITIES. Include these certifications in Volume I of the proposal.

4. EVALUATION CRITERIA AND PROGRAM POLICY FACTORS

4.1 INTRODUCTION

The prime consideration in the evaluation of proposals for financial assistance is to assess their merit in order to determine those proposals that offer the greatest likelihood of successfully demonstrating and subsequently commercializing emerging Clean Coal Technologies. The process of evaluation will consist of:

- (a) Qualification,
- (b) Preliminary Evaluation,
- (c) Comprehensive Evaluation,
- (d) Consideration of Program Policy Factors, and
- (e) Application of Other Considerations.

The Source Selection Official will select proposal(s) for negotiations leading to award by taking into account the evaluation criteria, relevant program policy factors and other considerations in order to determine the mix of projects that will best further the objectives and goals of this PON.

4.2 QUALIFICATION

In order to be considered in the Preliminary Evaluation phase, a proposal must successfully pass Qualification. Failure to meet one or more of the Qualification Criteria will result in rejection of the proposal. In the event that a proposal is rejected, a notice will be sent to the proposer stating the reason(s) that the proposal will not be considered for financial assistance under this solicitation.

The proposal must meet the following Qualification Criteria:

- (a) The proposed Demonstration Project or facility must be located in the United States.
- (b) The proposed Demonstration Project must be designed for and operated with coal(s). These coals must be from mines located in the United States.
- (c) The proposer must agree to provide a cost share of at least 50 percent of total allowable project cost, with at least 50 percent in each of the three project phases.
- (d) The proposer must have access to, and use of, the proposed site and any proposed alternate site(s) for the duration of the project.
- (e) The proposed project team must be identified and firmly committed to fulfilling its proposed role in the project.
- (f) The proposer agrees that, if selected, it will submit a "Repayment Agreement" consistent with Section 7.7.
- (g) The proposal must be signed by a responsible official of the proposing organization authorized to contractually bind the organization to the performance of the Cooperative Agreement in its entirety.

4.3 PRELIMINARY EVALUATION

In order to be considered in the Comprehensive Evaluation phase, a proposal must successfully pass Preliminary Evaluation. Failure to meet one or more of the Preliminary Evaluation requirements will result in rejection of the proposal.

In the event that a proposal is rejected, a notice will be sent to the proposer stating the reason(s) that the proposal will not be considered for financial assistance under this solicitation. The requirements of the Preliminary Evaluation are as follows:

- (a) The proposal must be consistent with the objectives of this PON, as stated in Section 1.2.
- (b) The proposal must contain sufficient finance, management, technical, cost, and other information to enable Comprehensive Evaluation as described in the solicitation. The Proposal must include an explicit financing plan for the project.

4.4 COMPREHENSIVE EVALUATION

Proposers passing Preliminary Evaluation will have their Demonstration Project Proposal (Volume II), Commercial Concept Proposal (Volume III), and Cost and Finance Proposal (Volume IV) evaluated. This comprehensive evaluation will be performed against the criteria listed in this section. These criteria are divided into two categories.

The Technical Evaluation is conducted to determine the merits of the proposal with regard to the potential for success of both the Demonstration Project itself as well as the future commercial application of the demonstrated technology. As a result, the Technical Evaluation Criteria are further classified into Demonstration Project Factors and Commercialization Factors. The evaluation in this category results in a numerical score for each proposal against each of the Technical Evaluation Criteria.

The Cost and Finance Evaluation is conducted to determine the reasonableness of the cost estimate for completing the SOW and to verify the commitment and capability to finance the first Budget Period of the Cooperative Agreement (see

Section 5.5.2 for a definition of the first Budget Period) and the reasonableness of the financing plan and capability to commit the funding for the remainder of the project. The evaluation in this category will result in a numerical score for each proposal against each of the Cost and Finance Criteria.

4.4.1 Technical Evaluation Criteria

The Technical Evaluation Criteria are divided into two major categories. The Demonstration Project Factors deal with the proposed Demonstration Project itself. The criteria in this category assess the technical and environmental merit of the project and the technical and management approaches to execute the project.

Commercialization Factors address the projected commercial applications for the demonstrated technology. The criteria in this category assess the potential of the proposed technology to comply with the requirements of the Clean Air Act and to improve thermal efficiency at existing facilities as well as to meet future energy needs through the environmentally acceptable use of coal. The criteria assess the cost effectiveness of the proposed technology against existing technologies.

4.4.1.1 Demonstration Project Factors

(a) Technical Readiness

Technical readiness for demonstration at the size proposed, as evidenced by the adequacy, availability, suitability, and quality of the data and analyses that support a decision to advance to demonstration scale.

(b) Adequacy, Appropriateness, and Relevance of Demonstration

Adequacy, appropriateness, and relevance of the proposed project to contribute to the enhancement of technologies, techniques, or processes,

and provide new information to enable the private sector to make rational commercial decisions concerning utilization of the proposed technology. Included herein is the ability to generate the data necessary for commercialization and the ability to comply with the Clean Air Act.

(c) Environmental, Health, Safety, Socioeconomic, and other Site-Related Aspects

Adequacy and appropriateness of proposed approaches for meeting and exceeding all EHSS requirements and minimizing EHSS impacts of the proposed Demonstration Project. Extent to which current emissions of sulfur dioxide and/or oxides of nitrogen are reduced in accordance with the provisions of the Clean Air Act. Additional consideration will be given for the extent to which emissions of greenhouse gases and air toxics are reduced. The suitability, quality, and adequacy of the site(s) and/or facility(ies) for the proposed Demonstration Project. Additional consideration will be given for the extent to which the site enhances EHSS aspects.

(d) Technical and Management Approaches

Reasonableness and adequacy of the technical approach to the proposed Demonstration Project. Degree to which all aspects of the project are addressed, including design, construction, operation and disposition of the demonstration facility; data acquisition, analysis, evaluation and reporting. Degree to which the proposer's Statement of Work reflects the technical approach. Quality and completeness of the management approach to the proposed Demonstration Project. Credentials, experience and availability of identified key personnel, other personnel and resources (e.g., feedstock, facilities, and service) needed to execute the project. Commitment by the proposer and each project team member to make available the personnel and resources to execute the Demonstration Project.

4.4.1.2 Commercialization Factors

The following commercialization factors will be evaluated on a cumulative basis for existing and future coal-fired electric generation units in compliance with the Clean Air Act for the period 2000-2030 with respect to performance, thermal efficiency, commercialization approach, and the capability of addressing future energy needs.

(a) Environmental Performance at Existing Facilities and/or While Addressing Future Energy Needs

- (i) The extent to which the proposed technology, when used at existing facilities, will, with minimal EHSS impacts, reduce emissions of sulfur dioxide and/or the oxides of nitrogen, and will limit these emissions to comply with the terms of the Clean Air Act. The degree to which the proposed technology is likely to be more cost effective than existing technology for reducing emissions. The extent to which the proposed technology reduces the volume and/or toxicity of solid and liquid waste generated. Extra credit will be given for the extent to which emissions of greenhouse gases and air toxics are reduced.
- (ii) The extent to which the proposed technology, when used while addressing future energy needs, will, with minimal EHSS impacts, reduce emissions of sulfur dioxide and/or the oxides of nitrogen and will limit these emissions to comply with the terms of the Clean Air Act. The degree to which the proposed technology is likely to be more cost effective than existing technology for reducing emissions. The extent to which the proposed technology reduces the volume of solid and liquid

waste generated. Additional consideration will be given for the extent to which emissions of greenhouse gases and air toxics are reduced.

(b) Improved Thermal Efficiency at Existing Facilities and/or While Addressing Future Energy Needs

(i) The extent to which the proposed technology, when used at existing facilities, will improve the thermal efficiency (coal pile to bus bar) in a cost effective manner while controlling emissions of sulfur dioxide and/or the oxides of nitrogen when compared to currently available commercial technology options.

(ii) The extent to which the proposed technology, when used to address future energy needs, will improve the thermal efficiency (coal pile to bus bar) in a cost effective manner while controlling emissions of sulfur dioxide and/or the oxides of nitrogen when compared to currently available commercial technology options.

(c) Commercialization Approach

Adequacy of the proposed approach for bringing the technology from the demonstration to widespread commercial application for the purpose of satisfying the requirements of the Clean Air Act. The capability and commitment of the proposed project team to commercialize the technology demonstrated in this project.

4.4.2 Cost and Finance Evaluation Criteria

(a) Commitment and Capability to Finance the First Budget Period

Commitment of the non-DOE funds, subject to reasonable business conditions, for the completion of the activities for the first Budget Period of the project. Reasonableness of the proposed costs for the SOW activities for the first Budget Period. Financial condition and capability of the proposed financing sources to provide their respective share of the non-DOE portion of the first Budget Period costs. Additional consideration will be given for executed financing agreements and specific plans for providing for any potential shortfall in funding the first Budget Period activities.

(b) Financing Plan and Capability to Finance the Remainder of the Project

Adequacy and completeness of the plan to finance the remaining Budget Periods for accomplishing the SOW activities for the project. Reasonableness of the proposed costs for the SOW activities for these Budget Periods. Financial condition and capability of the proposed financing sources to commit the proposed non-DOE share of the project costs prior to the end of the first Budget Period. Ability to demonstrate that market agreements can be obtained to provide the revenue (if applicable) for financing the project. Additional consideration will be given to financial commitments or executed financing agreements and specific plans for providing for any potential shortfall in funding the completion of the project SOW activities.

(c) Project Team Financial Risks

Degree to which financial risk is assumed by members of the Project Team (excluding not-for-profit and government organizations unless these organizations are the Participant) as measured by the level of financing provided by the project team and especially the Participant. Additional consideration will be given for the project team cost sharing above the minimum 50% required, particularly in the early phases of the project.

4.4.3 Relative Importance of Criteria

The Technical Evaluation Criteria are three times as important as the Cost and Finance Evaluation Criteria.

Within the Technical Evaluation, each criterion will have the following weight:

Demonstration Project Factors

Technical Readiness	20%
Adequacy, Appropriateness, and Relevance of the Demonstration	15%
EHSS and other Site-Related Aspects	5%
Technical and Management Approach and Organizational Capability	10%
SUBTOTAL - Demonstration Project Factors	50%

Commercialization Factors

Environmental Performance at Existing Facilities and/or While Addressing Future Energy Needs	15%
Improved Thermal Efficiency at Existing Facilities and/or While Addressing Future Energy Needs	15%
Commercialization Approach	20%
SUBTOTAL - Commercialization Factors	50%
TOTAL	<hr/> 100%

Within the Cost and Finance Evaluation, each criterion will have the following weight:

Commitment and Capability to Finance the First Budget Period	40%
Finance Plan and Capability to Finance Remainder of the Project	40%
Project Team Financial Risk	20%
	<hr/>
TOTAL	100%

Other than considering the reasonableness of the cost estimate in support of the validity of the financing plan, the cost estimate will be of minimal importance to the selection.

4.4.4 Guide for Proposal Evaluation

DOE presents Table 1 as an aid to proposers in determining where to display information within the proposal. The criteria that DOE will use to evaluate proposals are listed in the left hand column. The proposal section (described in Section 5.2 of this PON) in which the information should be presented is displayed across the top.

The marks within each box represent whether DOE considers the section to be the primary (P) or secondary (s) source of information to use in its determinations. In the case of the Commercialization Approach, for example, Section III A will be important, but the primary source of information for the DOE evaluation of the Commercialization Plan will be Section III D.

DOE reserves the right to use any portion of a proposal in its evaluation.

TABLE 1
Guide for Proposal Evaluation

PROPOSAL SECTION* CRITERIA	II						III				IV			
	A	B	C	D	E	F	A	B	C	D	A	B	C	D
<u>Demonstration Factors</u>														
(a) Tech. Readiness		s	P											
(b) Adequacy		s	P											
(c) EHSS				P	P									
(d) Approach			s			P								
<u>Commercialization</u>														
(a) Environmental Performance							s	P						
(b) Thermal Efficiency							s		P					
(c) Commercialization Approach							s			P				
<u>Cost & Financing</u>														
(a) Commitment											s	P		
(b) Financing Plan											s		P	
(c) Financial Risk											s	s	s	P

* (See Section 5.2)

4.5 PROGRAM POLICY FACTORS

Program Policy Factors are factors which the Source Selection Official may use to select a range of projects that would best serve program objectives. In the following factors, the word "collectively" is meant to include projects selected in this solicitation and prior Clean Coal solicitations, as well as, other ongoing demonstrations in the United States. The following Program Policy Factors shall be considered:

- (a) The desirability of selecting projects that collectively represent a diversity of methods, technical approaches, and applications.

- (b) The desirability of selecting projects in this solicitation that contribute to near term reductions in transboundary transport of pollutants by producing an aggregate net reduction in emissions of sulfur dioxide and/or the oxides of nitrogen.
- (c) The desirability of selecting projects that collectively utilize a broad range of U.S. coals and are in locations which represent a diversity of EHSS, regulatory, and climatic conditions.
- (d) The desirability of selecting projects in this solicitation that achieve a balance between (1) reducing emissions and (2) providing for future energy needs by the environmentally acceptable use of coal or coal-based fuels.
- (e) The desirability of selecting projects that provide strategic and energy security benefits for remote, import - dependent sites, or that provide multiple fuel resource options for regions which are considerably dependent on one fuel form for total energy requirements.

4.6 OTHER CONSIDERATIONS

In the project selection process, DOE will consider giving preference to projects located in states for which the rate-making bodies of those states treat the Clean Coal Technologies the same as pollution control projects or technologies. The inclusion of this project selection consideration is intended to encourage states to utilize their authorities to promote the adoption of Clean Coal Technology projects as a means of improving the management of air quality within their areas and across broader geographical areas. Recognizing the benefits of pollution control to society, some states offer utilities more favorable rate treatment for pollution control equipment than for other utility investments. States which offer such incentives to Clean Coal Technologies may also serve to offset a portion of the additional risk inherent in demonstrations of new technologies.

The term "will consider giving preference" means that the Source Selection Official will use this consideration as a tie breaker if, after application of the Evaluation Criteria and the Program Policy Factors, two projects receive identical evaluation scores and remain essentially equal in value. This consideration will not be applied if, in doing so, the regional geographic distribution of the projects selected would be altered significantly.

Since DOE recognizes that actions pending by a ratemaking body take time to implement, a state will be considered to be treating Clean Coal Technologies the same as pollution control projects or technologies if the state regulatory body has taken action that indicates that the ratemaking body intends to implement such a policy prior to DOE's funding of any affected project(s).

5. PROPOSAL PREPARATION INSTRUCTIONS

5.1 PREPARATION OF QUALIFICATION PROPOSAL (VOLUME I)

The preparation of this Volume is very important. If the proposal does not meet the requirements identified in Section 4.2, "Qualification," the proposal shall not undergo Preliminary and Comprehensive evaluation. The proposer must address each of the Qualification Criteria listed in Section 4.2 and show how the proposal meets those criteria. The discussion should be sufficient unto itself for a determination of whether the proposal meets the Qualification Criteria. DOE has no obligation to refer to other volumes if the discussion provided in Volume I does not show that the Qualification Criteria have been met. For those criteria that require the completion of the certification forms provided in Appendices D and G, these forms must be submitted in this Volume and the certification forms in Appendix H must also be included in this Volume. Such certifications must be completed and signed by an individual with authority to legally bind the proposing organization. The information required to satisfy the Qualification Criteria is shown below:

(a) LOCATION OF DEMONSTRATION

The proposed Demonstration Project or facility (existing or new) must be located in the United States.

The proposer must identify the proposed location and show that it is within the United States. Information provided must include the state, county, and municipality (if applicable) in which the project(s) or facility(ies) will be located. Information must be provided for each site being considered.

(b) USE OF UNITED STATES COAL(S)

The proposed Demonstration Project must be designed for and operated with coal from mines located in the United States.

The proposer must provide a description of the type(s) and source(s) of coal(s) sufficient to verify that the coal(s) will be mined in the United States.

(c) COST SHARING

The proposer must agree to provide a cost share of at least 50 percent of the total project cost, with at least 50 percent in each of the three project Phases.

The proposer must complete the Certification Form contained in Appendix D and include it in Volume I of the proposal. Signing this form will confirm that the Government's cost share will not exceed 50 percent in any of the three project Phases.

(d) SITE AVAILABILITY

The proposer must have access to, and use of, the proposed primary site(s) and any proposed alternative site(s) for the duration of the project.

The proposer must document its access and right of use to the site. This documentation should include evidence of the proposer's ownership of the site, option to purchase the site, lease for the site, or letter signed by the owner of the site which provides firm evidence of the commitment of the owner to assure availability of the site. A letter from the site owner, if provided, must be signed by a corporate official or other appropriate person with authority to make binding commitments about use of the site.

If primary and alternate sites are being proposed, evidence of commitment of each site must be documented and submitted in the proposal. The information requested in Section 5 of this PON should be provided for each site, including technical, cost, financial and environmental information.

If different amounts of funding are being requested, depending on the site, or if different proposers are involved, additional SF 424's and/or Authorization Certification should be provided for those funds and proposers, and should clearly indicate for which site the forms are applicable. See Appendix G.

(e) PROJECT TEAM AGREEMENTS

The proposed project team must be identified and firmly committed to fulfilling its proposed role in the project. The project team should be made up of those organizations or parties responsible for proposing and accomplishing all phases of the Demonstration Project. The project team includes the legal entity responsible for the project (i.e., the prospective Participant), technology owners, major beneficiaries of the demonstrated technology, and other third parties identified in this proposal (excluding financial institutions) who are essential to the successful completion of the proposed Demonstration Project. Where a legal entity has been or will be created to conduct the project, and where as a result of DOE's analysis of the proposed entity's partners, joint venture members, etc., it is determined such members are substantially undercapitalized, the Department may require, for example, the parent organization(s) to (1) guarantee project performance, (2) guarantee project Financing, (3) guarantee repayment plan obligations, (4) guarantee the indemnification provision of the Cooperative Agreement in Appendix L (including environmental liability).

The proposer shall provide from each member of the team a legally binding agreement, or letter of intent to reach such agreement, that explicitly states the role of the team member in the project and the nature of its business relationship for purposes of this project. These documents must be signed by a corporate official or other appropriate person authorized to legally bind these entities. These letters shall be included in Volume I of the proposal.

(f) REPAYMENT

The proposer agrees that, if selected, it will submit a Repayment Plan consistent with Section 7.7.

The proposer must complete the Certification Form contained in Appendix D and include it in Volume I of the proposal. The Certification Form will serve to affirm that a Repayment Plan will be submitted after selection. (See Section 7.7, "Recovery of Government's Investment.")

(g) AUTHORIZATION

The proposer and each proposing entity must complete and include in Volume I of the proposal:

- o SF 424, in Appendix G, and
- o Authorization Certification, in Appendix G, if the proposer is a nongovernmental entity. If two or more organizations are proposing, each organization should provide a completed Certification Form.

- o The amount of DOE funding indicated on each form should be consistent between the forms and consistent with the Financial Plan in Appendix K, Exhibit D. The DOE funds indicated on the SF 424 and/or the Authorization Certification represent the amount of DOE assistance being requested by this proposal.

5.2 ORGANIZATION OF VOLUMES II - IV

To help in the evaluation, all proposals must adhere to the following outline:

Volume II: Demonstration Project

- II.A Introduction
- II.B Project Technical Description*
- II.C Detailed Description of Novel Technology
- II.D Site*
- II.E Project Environmental Aspects*
- II.F Technical and Management Approaches*
- II.G Exceptions, Deviations, and Assumptions

Volume III: Commercial Concept

- III.A Introduction
- III.B Environmental Performance at Existing Facilities and/or While Addressing Future Energy Needs
- III.C Thermal Efficiency at Existing Facilities and/or While Addressing Future Energy Needs
- III.D Commercialization Approach
- III.E Exceptions, Deviations, and Assumptions

Volume IV: Cost and Finance

- IV.A Cost Estimate*

- IV.B Commitment and Capability to Finance the First
 Budget Period*
- IV.C Financing Plan and Capability to Finance the
 Remainder of the Project*
- IV.D Project Team Financial Risk*
- IV.E Exceptions, Deviations, and Assumptions

*Supplemental proposal sections should be supplied for each alternate site.

5.3 PREPARATION OF DEMONSTRATION PROJECT PROPOSAL (VOLUME II)

The purpose of this Volume is to describe the Demonstration Project itself. The format for this Volume asks for information in increasing levels of detail.

5.3.1 Proposal Section II.A - Introduction

The proposer shall provide a Public Abstract and a Project Summary Form which will give an overview of the Demonstration Project and the proposed technology.

5.3.1.1 Public Abstract

The Public Abstract shall consist of not more than 750 words giving a brief overview of the proposed project, the specific proposed Clean Coal Technology, the title of the project, the name of the proposer, the full mailing address of the proposer, and the key members of the proposed project team. The name and telephone number of a primary contact is also desirable at the discretion of the proposer. Not more than two 8.5" by 11" diagrams may be submitted by the proposer. This abstract may be released to the public by DOE in whole or in part at any time. It, therefore, should not contain proprietary data or confidential business information. The form that should be used for the preparation of the Public Abstract appears in Appendix E. Additional sheets may be added as necessary. Proposers should also submit one separate, unbound copy of the Public Abstract in package 1 (Section 3.31).

5.3.1.2 Project Summary Form

The proposer shall complete and submit the Project Summary Form provided in Appendix F. Information considered to be proprietary or business confidential should be appropriately marked. DOE will use this form, excluding proprietary and business confidential information, in its Comprehensive Report to Congress which is issued after selection. Proposers should also submit one separate unbound copy of the Project Summary Form in package 1 (Section 3.31).

Instructions for completing this form are:

- (1) Technology Type. Same as for the proposal cover forms, Item (2). See Section 3.30, "Cover Sheet Instructions".
- (2) Proposal Title. Same as for the proposal cover forms, Item (3). See Section 3.30, "Cover Sheet Instructions".
- (3) Proposer's Name and Address. Same as for the proposal cover forms, Item (4). See Section 3.30, "Cover Sheet Instructions". Provide the full mailing address of the proposer. This address should reflect the party whom DOE will contact when necessary.
- (4) Principal Contact. Enter the name, title, and phone number for the person whom DOE should contact if the need arises.
- (5) Site(s) Location. Identify the geographic location(s) of the proposed project to the extent possible, by city, county and state.
- (6) Congressional District(s). Identify the congressional districts for the project site and for the proposer's address.

- (7) Applications. Refers to commercial use of proposed Clean Coal Technology, e.g., retrofit to coal-fired industrial boiler, repowering of large electric utility generating unit, and new fuel forms.
- (8) Types of Coal to be Used in the Proposed Demonstration Project, coal bed name and typical sulfur content, e.g., Pittsburgh Number 8 (3% sulfur).
- (9) Coal Source. Refers to above Item (8); mine and location if known.
- (10) Coal Use Rate or Other Measure of Proposed Project Size, e.g., 10 tons of coal/hour, 650 MWe power plant retrofit, etc.
- (11) Proposed Duration of Each Project Phase, in months.
- (12) Proposed Project Total Duration, in months.
- (13) Proposed Project Cost by Phase. State the cost of the proposed project by phase. Include Preaward costs with Phase I.
- (14) Estimated Total Cost of the Project (Proposer and Government).
- (15) Proposer's Cost Share for Each Phase. State as percentages of the costs given for above Item (13).
- (16) Proposer's Cost Share. State the percentage of the total given for above Item (14).
- (17) Project Team Members. (See Section 3.9, "Solicitation Definitions," and Section 5.1, "Preparation of Volume I: Qualification Proposal," Part (e), "Project Team Agreements.") Use additional sheets of paper if necessary.

5.3.2 Proposal Section II.B - Project Technical Description

The proposer shall provide a general description of the proposed project. This discussion should show how the demonstrated technology will be used either alone or in combination with other available technology options. This discussion should address the following topics:

- o The process concept and how it operates (include preliminary process flow diagram(s) with major equipment items and energy and material balances around each major process unit and the overall plant, indicating temperature, pressure, and composition of major streams).
- o Inherent advantages of the process compared with available commercial technologies.
- o The important process chemistry.
- o Other information the proposer believes is necessary to provide a clear understanding of the processes involved in the demonstration facility.

5.3.3 Proposal Section II.C - Detailed Description of Novel Technology

5.3.3.1 Proposal Section II.C.1 - Proposed Technology Description

The proposer must provide a specific discussion of the innovative aspects of the proposed technology. A technology envelope must be drawn around that portion of the proposed facility that represents the novel aspects of the demonstration. Equipment outside of this envelope should be commercially available and represent a low to negligible technical risk in the service proposed. The proposer must identify the demonstration technology so that Demonstration Project Factors (a) and (b) can be evaluated (see Section 4.4.1.1).

5.3.3.2 Proposal Section II.C.2 - Technology Development Status and Readiness for Demonstration

The proposal must discuss and provide evidence of the readiness of the technology for demonstration at the size proposed. The proposer must document work accomplished to date, including a discussion of the data collected in the earlier development of the technology. The proposer should distinguish its prior work from third party work, and discuss the relevance of third party work to the proposed project. The extent of process work completed to date, including throughput, conditions of operation, and duration of testing must also be provided. The key process transitions (where applicable) from bench to pilot scale and from batch to continuous operation must be discussed and data and results from these operations should be provided to demonstrate that a sufficient basis exists for scaleup.

A discussion also must be provided to show the degree of scaleup required to bring the technology from its current state of development to the demonstration scale proposed. In this scaleup discussion, the proposer must identify all significant items of equipment and processes that have not operated at the proposed scale or with the proposed technology, conditions of operation expected during the Demonstration Project, and discuss key process integration issues, risks and uncertainties based on prior work.

The technical risks that could affect the success of the Demonstration Project must be identified and discussed. The discussion must address any measures proposed to mitigate or overcome these risks. The proposer also should provide any other pertinent information that serves to show that the data base supports the decision to advance the technology to the proposed demonstration scale.

5.3.3.3 Proposal Section II.C.3 - Adequacy, Appropriateness, and Relevance of the Demonstration

The proposer must explain how the information generated during the Demonstration Project will enable the private sector to make rational commercialization decisions. The project itself must demonstrate all the facets of the proposed technology that are inside the technology envelope (see Section 5.3.3.1) and that are key to commercial implementation (e.g., process integration, vessel scale, etc.). The Demonstration Project, however, need not be a complete, full-scale prototype commercial plant. It may be, for example, a single module in a multi-module plant or be of smaller than commercial scale. It may be conducted at a new facility. The proposer does not need to include all the unit operations that would be present in a commercial plant if evidence is submitted showing that the components or subsystems not included have already been successfully demonstrated or are used commercially. If these components or subsystems are being demonstrated elsewhere, or are planned to be demonstrated elsewhere, the proposer must provide complete information on these activities. This discussion should be sufficient to explain how the results of these other demonstrations will add to the database needed for commercialization.

As part of this discussion, the proposer must address at least the following topics:

- o Rationale for project size
 - justification of project size regarding expected commercial applications,
 - document circumstances where financing or other considerations require larger sizes than otherwise needed for demonstration.

- o Relationship to other work
 - degree to which technical approach has not been demonstrated at commercial scale,
 - justification for duplication with other demonstrations.

- o Degree of uncertainty in moving from demonstration to commercial scale
 - identify key data and test results (technical, economic, environmental, and operating) from Demonstration Project that are needed to support the commercialization,
 - how will the demonstration data be utilized.

Proposed projects that include unnecessary elements (e.g., components, systems, processes, or operations that have already achieved widespread commercial acceptance and are not required for successfully demonstrating the proposed technology) will be considered to be less than fully appropriate. Choice of a project size larger than necessary to provide the key information for commercialization, and/or the scheduling of unnecessary tasks or tests, and/or the collection of unnecessary or of only marginally important data, will also be considered less than fully appropriate. It is recognized that project financing considerations may necessitate the inclusion of components, subsystems, tests, or choice of project scale that is other than that required to provide the minimum necessary technical data. In such instances, the proposer should fully document the extenuating circumstances.

5.3.4 Proposal Section II.D - Site

5.3.4.1 Proposal Section II.D.1 - Site Description

Describe the site location and salient characteristics including the requirements and availability of labor, raw materials, utilities, and other infrastructure needed for construction and operation. For key resources such as coal and water, state requirements and the plan to acquire them including resources, methods of extraction, transportation, and beneficiation. For water, discuss potential constraints on availability.

5.3.4.2 Proposal Section II.D.2 - Site Suitability

Discuss the advantages and disadvantages of the proposed site in the context of the demonstration. This discussion should include any interfaces with existing facilities.

5.3.5 Proposal Section II.E - Project Environmental Aspects

Information supplied in this section will be used in the preparation of the "Pre-Selection Project Specific Environmental Review" (See Section 3.26.2).

5.3.5.1 Proposal Section II.E.1 - Emission Reduction of SO₂ and NO_x

Analyze and discuss the changes in emissions of SO₂ and NO_x attributable to the project, including the effects of modifications in equipment and operating procedures (e.g., load factor and output). Include calculations and prediction for the increase or decrease of SO₂ and NO_x at the demonstration site (e.g., 10⁶ lb/yr) as a result of the Demonstration Project. Include the basis for calculations (e.g., availability factor) in the discussion. Discuss any special considerations that should be taken into account by DOE in evaluating impacts of project-related emissions changes on air quality and acidic deposition.

5.3.5.2 Proposal Section II.E.2 - Reduction/Control of Greenhouse Gases and Air Toxics

Discuss the changes in emissions of greenhouse gases and air toxics attributable to the Demonstration Project at the demonstration site. Include calculation and prediction for the increase or decrease of greenhouse gases and air toxics at the demonstration site (e.g., 10^6 lb/yr) as a result of the Demonstration Project.

Basis for calculation (e.g., availability factor, on-stream factor, etc.) should be included in discussion. Describe the provisions for reducing/controlling impacts of project-related emissions of greenhouse gases or air toxics.

5.3.5.3 Proposal Section II.E.3 - Production and Handling of Other Effluents, Wastes, and Byproducts

Describe the provisions for handling and managing solid and liquid wastes, describing methods for storage, treatment, transportation, use, or disposal. Estimate volumes and composition of each waste stream and final product. For disposal, discuss whether stabilization or pretreatment will be required, the availability of disposal sites, and whether liners and monitoring will be required at disposal sites. If utilization of waste is planned, describe the uses and markets.

5.3.5.4 Proposal Section II.E.4 - EHSS Compliance

Identify EHSS requirements as of January 1, 1991, applicable to the demonstration and describe the capability to comply with relevant EHSS regulations and standards. Estimate environmental discharges (air emissions, water effluents, liquid and solid wastes, etc.) and compare with relevant standards. Provide data and analyses to support conclusions about compliance, including relevant preproposal test data, analyses of technology and process performance. Include

information about similar applications for any planned control technologies. Summarize the status and schedule for obtaining permits, modifications to permits required for existing facilities, and anticipated impediments to the permitting process. Discuss options available for controlling discharges (e.g., process design variations and alternative control methods) if compliance problems exist (e.g., performance shortcomings or more stringent regulations). Discuss how the project, if located in a non-industrial area, will blend with its surroundings in an aesthetically acceptable manner.

5.3.5.5 Proposal Section II.E.5 - EHSS Risks and Impacts

Identify EHSS risks and impacts of the proposed project, such as potential impacts on human and animal populations, historical sites, parks, wilderness areas, and sensitive resources within the range of influence of the project.

Also summarize the general approach, special safeguards, and environmental controls that will be used to ensure the protection of project workers and local residents from health and safety risks. If retrofitting or repowering an existing facility, directly compare the EHSS attributes of the project to those of the existing facility. Describe discharge reductions or increases resulting from the project. In particular, estimate changes in air emissions and water effluents and their impact on local air and water quality.

5.3.6 Proposal Section II.F. - Technical and Management Approaches

5.3.6.1 Proposal Section II.F.1. - Technical Approach

The proposer should describe the plans for the Demonstration Project at a level of detail appropriate for the planning stage of a Demonstration Project.

The proposer must define and discuss the logic for the technical approach employed to complete the project. This discussion must include but is not limited to the following aspects:

- o how pre-demonstration background data will be used to design and construct the demonstration facility
- o how operations will be conducted to collect the data identified in Section II.C.3
- o how project technical and environmental data will be analyzed evaluated and reported
- o how variances to schedule and costs will be resolved
- o final disposition of the demonstration facility
- o disposition of the demonstration products and byproducts, and the extent to which the demonstration plant operation is dependent upon disposition of the products and byproducts

The proposer must provide a SOW of sufficient detail to verify the technical approach. This SOW should appear as Appendix A to Volume II of the proposal. The SOW must outline the project by tasks according to a WBS listing the logical sequence of activities to complete the project. The SOW should include a project milestone schedule including decision points. The proposed SOW must define the project work and be structured in agreement with the following WBS:

- WBS Level 1 - Total Project
- WBS Level 2 - Project Phases
- WBS Level 3 - Work Tasks

Project phases should be structured as follows:

Phase I: Design
Phase II: Construction
Phase III: Operation

For the purposes of this proposal, Pre-award activities should be identified and discussed in the First Phase of the proposed project.

The Government requires the reporting of certain technical, economic, and environmental data that will result from the project. Attachment C to the Model Cooperative Agreement (Appendix L) contains the list of expected reports.

Proposers should review this list and make suitable provisions in project planning. The SOW must also provide for formal project reviews. The number and timing of such reviews should be consistent with the size and scope of the Demonstration Project.

The proposer must provide and discuss a milestone schedule which identifies project phases and major decision points. The proposer is cautioned that completion of NEPA requirements (40 CFR Part § 1506.1) by DOE may take as long as 12 months for an Environmental Assessment and approximately 24 months for an Environmental Impact Statement. A discussion of the Government role in project decision making appears in Section 6.3 and in Article III(B) of the Model Cooperative Agreement (Appendix L).

The three project phases must correspond to design, construction, and operation, as shown in Section 5.3.6.1. Subdivision and overlap of the phases, however, is permissible. Key milestones during each phase should be identified and described.

The major project decision points identified by the proposer will represent explicit decisions by both the participant and DOE either to continue or end participation in the project. These decision points need not correspond to the beginning or end of project phases. They will serve, however, to define the project budget periods. As a result, the proposer should explain the rationale for the decision points selected. A discussion of the precise mechanism to provide for continuation from one budget period to the next appears in Section 6.3. See also Appendix L, Article VIII, Project Decision Making.

5.3.6.2 Proposal Section II.F.2 - Management Approach

The proposer must describe the project team, showing organizational and functional relationships, integration of all efforts of project team members and all related subcontractors. The proposer should describe the experience and success of the project team with projects involving similar technologies and projects of similar scope or complexity. An organization chart showing key personnel with man-hours and percentage of key-personnel time that will be devoted to the proposed project shall be included. A discussion of how variances to project schedule and costs will be managed, and an approach to developing remedial action. A statement of availability of all key personnel also shall be included.

Resumes of key personnel, describing education, technical/management experience, and professional development shall be provided. Resumes of personnel identified for specific positions shall present relevant qualifications. The proposer should expect that these key personnel will be named in the Cooperative Agreement.

List all other resources (e.g., facilities) proposed for use in the Demonstration Project, and identify which project team member will provide those resources.

5.3.6.3 Proposal Section II.F.3 - Commitments to the Project

The proposer and each team member must confirm its commitment to the project. Such confirmation should include but not necessarily be limited to documentation signed by the proposer's and each project team member's senior management to commit to:

- o providing those key personnel, other personnel and resources (feedstocks, facilities, and services) needed to execute the project
- o providing alternates if key personnel, other personnel or resources become unavailable during the course of the project
- o making prudent effort to maintain the project on schedule and within budget
- o reporting variances to schedule and costs as soon as proposer identifies them, and an approach to developing remedial action

5.3.7 Proposal Section II.G. - Exceptions, Deviations, and Assumptions

The proposer shall identify and explain exceptions, deviations, or conditional assumptions taken to the requirements of this Volume. Any exceptions, deviations, or conditional assumptions taken must contain sufficient explanation and justification to permit evaluation. Numerous exceptions, or one or more significant exceptions, may result in rejection of the proposal as unacceptable. Selection of a proposal for negotiation will not be an indication that DOE accepts the exception, deviation, or conditional assumption contained in the proposal.

5.4 PREPARATION OF COMMERCIAL CONCEPT PROPOSAL (VOLUME III)

In Volume III, DOE expects the proposer to present the commercial embodiment of the demonstration technology as envisioned by the technology owner. This information will be used to evaluate the potential for commercial replication of the technology, and the degree to which the proposed technology satisfies the criteria embodied in the three Commercialization Factors (a), (b) and (c).

- (a) Environmental Performance at Existing Facilities and/or While Addressing Future Energy Needs
- (b) Improved Thermal Efficiency at Existing Facilities and/or While Addressing Future Energy Needs
- (c) Commercialization Approach

For the purposes of this solicitation, commercial embodiment of the demonstration technology, or, mature commercial version of the demonstration technology is defined as a well established technology that has been utilized in five or more commercial installations. The cost and performance characteristics assume a commercial plant installation that has been replicated several times and full advantage can be taken of any technical/economic learning curves and economies of scale. Certain technologies and equipment items may be offered by several or many vendors in competition with each other.

5.4.1 Proposal Section III.A - Introduction

This section should briefly describe the anticipated commercial version(s) of the proposed technology. This description should include all key features of the commercial embodiment of the technology, expected sizes or range of sizes, and important interfaces with other equipment or processes. A brief process

description should be included, and those features that differ from the demonstration project should be addressed. The proposer should also present a brief overview of expected market applications for the technology.

5.4.2 Proposal Section III.B - Environmental Performance at Existing Facilities and/or While Addressing Future Energy Needs

DOE has developed a methodology for evaluating the commercial potential of advanced retrofit and repowering technologies, which may be used to upgrade existing facilities or for replacement programs or greenfield installations, to improve environmental performance and thermal efficiency at existing facilities and/or while addressing future energy needs. The methodology is described in more detail in Appendix I. Proposers should provide information requested in Appendix I on performance at existing facilities or while addressing future energy needs or both. Note, however, that, in order to receive full credit for the evaluation of this part of the proposal, information on both aspects of performance must be provided.

As appropriate proposals will be analyzed within three categories: electric utility, industrial boilers and processes (including coal direct or indirect coal liquefaction, mild gasification and other coal conversion processes), and coal cleaning/upgrading technologies. For all proposed technologies, the data required by DOE to perform the analyses are obtained from the proposer via a set of worksheets contained in Appendix I. DOE's methodology compares the proposed technology with commercially available technologies to provide, in the case of electric utilities, a least cost of electricity deployment of control technologies to achieve the goals of the Clean Air Act and to provide for energy demand growth in the post 2000 period. Quantitative estimates of emissions, thermal efficiency and cost of electricity that would result by application of the proposed technology are provided. A similar systems analysis is accomplished for technologies which fall in the coal cleaning/up-grading category. A unit analysis approach is conducted for technologies that fall in the industrial boilers and processes category.

5.4.2.1 Electric Utility

Using a database of existing power generation units, and the information provided by the proposer in Appendix I, DOE will determine to which units the proposed technology is applicable, and will deploy the proposed technology on a least cost of electricity basis compared to conventional control technology, up to the allowable level of emissions provided for in the Clean Air Act. Also, using projections of demand growth by power pool through the year 2030, assuming that the proposed technology will satisfy this demand and meet New Source Performance Standards (NSPS) for emissions, DOE will further deploy the proposed technology on a least cost of electricity basis compared to conventional control technology to provide for future energy needs, again maintaining the allowable level of emissions provided for in the Clean Air Act. In the event that the proposed technology does not satisfy New Source Performance Standards (NSPS) for sulfur dioxide and nitrogen oxides emissions for application to new capacity additions required by demand growth, the proposed technology will not be deployed in the 2000 - 2030 time period. DOE will then estimate the environmental performance, thermal efficiency and incremental cost of electricity that results from deployment of the proposed technology. These estimates will be compared with estimates for using currently available commercial emissions control technology options for existing units, and options for repowering, replacement and greenfield programs to meet projected demand through the year 2030.

The worksheets in Appendix I, to be completed by the proposer, will provide estimated cost and performance data for application of a mature version of the proposed retrofit or repowering technology (which may include a replacement project) to a "reference" plant. One such reference that is applicable to many proposed technologies is the hypothetical 300 MWe coal-fired electric utility plant described in detail in Attachment A to Appendix I.

DOE recognizes that this reference plant may not be appropriate for certain proposed technologies applicable only to a specialized segment of the existing

utility population such as small cyclone boilers. The proposer may, in these cases, or for any other reason, choose to provide a different reference plant. Any such alternative reference plant or facility provided by the proposer should be described and characterized in the same manner as the reference plants provided by DOE in Attachment A to Appendix I.

5.4.2.2 Industrial Boilers and Processes

The Industrial Boilers and Processes category includes all applications that are not expressly built to generate electricity or to clean coal prior to its final use. Examples of this category include: generation of process steam with/without electricity, coal liquefaction, or mild gasification to produce coal liquids and char. The products from these processes may or may not be upgraded, depending upon the intended markets. Multiple products may be generated from any of these processes.

For industrial boilers and processes, characteristics of the total market(s) are not known with the same detail as the power generation market for utilities. Since the targeted market(s) could vary widely depending upon the proposed technology, the proposer must identify the conventional application technology and the environmental control system that is competitive with (or would be replaced by) the proposed technology.

The environmental performance, cost effectiveness and thermal efficiency, will be evaluated for both the proposed technology and the conventional technology identified by the proposer. However, unlike the electric utility category, DOE will perform the comparisons for a single application rather than for the total market(s).

The widespread applicability, or potential market penetration, for the technology cannot be evaluated without additional information being provided by the proposer. To allow DOE to assess these market data, the proposer shall identify the market(s), and provide an estimate of the total market(s) size and market(s)

share for the proposed technology through the year 2030. DOE will accept, reject or modify the proposer's estimates for market penetration for the proposed technology through the year 2030.

5.4.2.3 Coal Cleaning/Upgrading Technologies (CCUT)

Coal cleaning/upgrading technologies (CCUT) are considered to produce a refined coal that may be transported to one or more sites for end use combustion. For evaluation purposes CCUT technologies will be treated in the same manner as retrofit technologies. Usually the refined coal products have a lower sulfur content than the feed coal. Thus, use of such coal products represents an alternative path to retrofits applied at the existing boiler site. DOE evaluates low rank coal and high rank coal CCUT technologies differently by distinguishing between the ways the two kinds of technologies will compete for market share.

For high rank coals the proposer is asked to provide cost and process performance data for the proposed technology for a range of U.S. steam coals with varying sulfur content. In addition, if any costs are incurred to modify the existing facilities to permit use of the processed coal fuel, these costs must be identified and quantified by the proposer. The commercialization evaluation for environmental performance, cost effectiveness and thermal efficiency is performed in a manner similar to that used for the electric utility commercialization evaluation.

For CCUT technologies directed at low rank coals the proposer is required to identify the source location for one coal feedstock, and provide the cost and performance data utilizing the selected coal, and identify any requirements for modification of the existing boiler facilities. DOE estimates the transportation costs for the refined coal product and completes the calculation for the evaluation factors. The methodology is discussed in more detail in Appendix I.

5.4.2.4 Other EHSS Impacts

The proposer must discuss the EHSS impacts (other than emissions of sulfur dioxide and the oxides of nitrogen) of the proposed technology in its commercial scale implementation. In this context, EHSS includes air quality and emissions, water quality and effluents, solid waste treatment, storage and disposal, water resource requirements, health, safety and, if applicable, socioeconomic aspects. A discussion must be provided stating how expected environmental emissions, occupational or public exposure to waste streams, intermediate process streams or products, and byproducts produced by the proposed technology will meet or exceed the requirements of existing statutes and regulations. This discussion should include any aspects that may present a problem in achieving compliance.

Effluents and impacts should be described in terms of unit quantities per ton of feed coal and total quantities for a typical plant, as appropriate. This typical plant should be the facility used for providing the inputs to the information discussed in Sections 5.4.2, 5.4.3 and Appendix I. The following information should be specifically included, with quantities given in lb/MMBtu of feed coal unless otherwise stated:

- o identify types and quantities of nonhazardous (include exempted) waste expected to be generated
- o identify types and quantities of hazardous waste expected to be generated
- o identify characteristics and quantities of coal ash expected to be generated
- o total particulates expected to be emitted
- o sulfur compounds other than SO_2 (e.g., SO_3 , H_2S) expected to be emitted (lb sulfur/MMBtu of feed coal)
- o identify types and quantities of wastewater streams and list total suspended solids in each wastewater stream
- o identify types and quantities of byproducts (e.g., tars, oils, sulfur, etc.)
- o water consumption (gal/MMBtu of feed coal)

For those technologies which produce a product or byproduct intended for use as a fuel or feedstock at another site, the proposer should address the expected environmental performance of that fuel or feedstock in its anticipated use as well as the production facility for the product/byproduct.

The proposer must explicitly discuss the production and disposal of solid wastes and, if appropriate, their use or conversion to useful byproducts. If reductions of greenhouse gases are anticipated in the commercialization of the technology at existing facilities, describe the extent and nature of these reductions.

5.4.3 Proposal Section III.C - Improved Thermal Efficiency at Existing Facilities and/or While Addressing Future Energy Needs

Using the deployment projection for the proposed technology provided by the evaluation described in prior Sections (refer to Sections 5.4.2.1, 5.4.2.2 and 5.4.2.3 above and Appendix I for detailed instructions), DOE will estimate, through the year 2030, a composite thermal efficiency for the existing facilities and the repowered, replacement or greenfield facilities projected for future energy needs. The composite thermal efficiency will be derived at the same time environmental performance is evaluated. Again, this composite thermal efficiency will be compared to the composite thermal efficiency obtained if existing emissions are assumed controlled with conventional technology, and future energy needs are assumed satisfied utilizing conventional emissions control technology.

Proposers should provide the information requested in Appendix I on performance at existing facilities or while addressing future energy needs or both. Note, however, that, in order to receive full credit for the evaluation of this part of the proposal, information on both aspects of performance must be provided.

5.4.4 Proposal Section III.D - Commercialization Approach

The proposer must discuss how it intends to commercialize the proposed Clean Coal Technology consistent with the requirements of the Clean Air Act. The discussion should define the proposer's role and the role of other parties,

including applicable demonstration project team members, in the commercialization of the technology in the United States. All relevant business aspects should be discussed in sufficient detail to clearly show how the demonstration project fits into the commercialization approach, and to identify the extent to which the commercialization of this technology will ensure a competitive position for U.S.-based industry in applicable domestic and international markets, and provide subsequent value-added benefits to the U.S. economy (an enhanced trade position, jobs for U.S. workers, increased tax revenues, etc.).

All critical factors required to achieve commercialization, such as financing, licensing, engineering, manufacturing and marketing, must be identified and discussed. Describe how any needed changes in infrastructure (including distribution, equipment servicing, etc.) that are necessary to achieve commercialization will be accomplished.

A timetable or milestone chart must be provided to identify major commercialization goals and the schedule for completion. The chart should graphically depict market penetration through the year 2030, if applicable. Any additional requirements for demonstration of the technology at other operational scales, as well as significant planned parallel efforts to the demonstration project which affect the commercialization schedule, must be identified. The planning for this additional work must be thoroughly addressed. The proposer must describe the range of sizes expected in commercial application and must discuss any special scaling aspects which may exist. Sizes should be identified by feedstock or product stream rates, energy output, or other measure appropriate to the particular technology and market application.

The proposer must describe and estimate the size of the total expected market applicable to the proposed control technology through the year 2030, the portion that it projects the technology will capture within the requirements established by the Clean Air Act and through the year 2030, and the time phasing of this market penetration. This market need not be confined to the retrofit or repowering of existing facilities. The specific application(s) envisioned by the proposer should be identified. The proposer should assume that markets will

develop in agreement with the Reference Case projections through the year 2030 contained in a draft of The National Energy Strategy, DOE, Office of Policy, Planning and Analysis, December 1990. (See Appendix P). Foreign, domestic and export markets should be presented separately. If the technology owner intends to address foreign or export markets, the proposal should include a discussion of any special institutional or regulatory impediments that might exist in the target markets.

The proposer must identify principal competing technologies, and competing processes or systems within the same technology definition, and discuss the competitive advantages of the proposed technology (capital requirements, operating economics, reduced waste streams, greater emissions reductions, higher thermal efficiency, etc.).

As evidence of the proposer's commitment to the Commercialization Approach the proposer should describe and explain the priority placed by the proposer's senior management, and/or its parent's senior management, and the senior management of key project team members, for accomplishing the commercialization effort. Describe how the proposed project fits into the various corporate entities' business, marketing or energy utilization strategies. Describe the individual corporate investments to date in development of the technology, and the cost of any significant parallel efforts that will be on-going during the demonstration project. Provide specific statements by senior management of the various concerned firms showing commitment to the project and subsequent commercialization efforts.

5.4.5 Proposal Section III.E - Exceptions, Deviations, and Assumptions

The proposer shall identify and explain exceptions, deviations, or conditional assumptions taken to the requirements of this Volume. Any exceptions, deviations, or conditional assumptions taken must contain sufficient explanation and justification to permit evaluation. Numerous exceptions, or one or more significant exceptions, may result in rejection of the proposal as unacceptable.

Selection of a proposal for negotiation will not be an indication that DOE accepts the exception, deviation, or conditional assumption contained in the proposal.

5.5 PREPARATION OF COST AND FINANCE PROPOSAL (VOLUME IV)

The contents of Volume IV should provide DOE with sufficient information to evaluate the Clean Coal Technology Demonstration Project proposal with respect to the Cost and Finance Criteria presented in Section 4.4.2. The information requirements for the Cost and Finance Evaluation Criteria are described below under the respective section headings (see outline in Section 5.2 of the PON) for the Cost and Finance volume.

As noted in Section 4.4.3, the cost estimate plays a minor role in the evaluation of proposals submitted under this PON. Attention is called, however, to Section 6.1 which addresses the subject of information flow for successful proposals. Although the detail of the cost information requested in the PON is at a summary level, proposers should expect that a detailed cost estimate will be requested after selection. During the post selection process described in Section 6.1, an in-depth review will be made of this detailed cost estimate. At that time if the total project cost has increased over that requested in the original proposal, DOE will be under no obligation to increase the amount of DOE funding above that requested in the Financing Plan. It is, therefore, anticipated that proposers will give the cost estimate serious attention.

Complete the Preaward Accounting System Information in Appendix O and complete the certifications in Appendix H, ASSURANCES - NON-CONSTRUCTION PROGRAMS; CERTIFICATION REGARDING DRUG-FREE WORKPLACE REQUIREMENTS; Certification Regarding Debarment, Suspension, and Other Responsibility Matters Primary Covered Transactions; and DISCLOSURE OF LOBBYING ACTIVITIES. Include these documents at the end of Volume IV.

5.5.1 Proposal Section IV.A - COST ESTIMATE

Only the summary cost information contained in Exhibits A through C in Appendix K will be evaluated for the reasonableness of the cost estimate. The information contained in Exhibit G will be used primarily as a reference for formulating detailed cost estimates during negotiations following project selection. Although the detail of the cost information requested in Appendix K is at a summary level, successful proposers may be required to submit a more detailed cost estimate after selection and prior to Award. Guidelines for the preparation of this estimate will be provided during the post selection fact finding process. If the post selection cost estimate is higher than the cost estimate submitted in the proposal, DOE will be under no obligation to increase the amount of DOE funding above that which was requested in the proposal. Therefore, it is very important that the proposer develop an estimate which is adequate for completing the SOW activities. The proposer should remember, when developing the cost estimate, to consider the potential schedule impacts of the NEPA process (discussed in Section 5.3.6.2). The cost estimate (including preaward cost) should be consistent with the requirements of Sections 7.1 through 7.4 which define the limits of DOE cost sharing and address the allowable and non-allowable costs.

The estimated costs for the proposed SOW must be presented using the formats and instructions described in Exhibits A through C of Appendix K. Cost information must be consistent with the WBS and SOW for the proposed project.

- o Exhibit A presents a summary estimate in whole dollars by phase (Preaward, Phase I - Design, Phase II - Construction and Phase III - Operation) and by task. The SOW divides the work to be done into identifiable tasks which provide the basis for the schedule and cost estimate for the project. The project definition activities should be identified as separate tasks in Phase I. At this time, information below level three of the WBS (i.e. project tasks) is

not desired. However, as described in section 6.1, cost details beyond the information submitted in Appendix K should be available for review and assessment during the post selection period.

- o Exhibit B is to be completed in accordance with the instructions in Appendix K. This exhibit delineates the cost estimate by phase, task and element (labor, materials and equipment, etc.) for the overall project and for each of the project team members.
- o Exhibit C further delineates the equipment cost by equipment item.

When completing these forms, check consistency among Exhibits A through G as well as with the Authorization Certification or Standard Form 424 in Appendix G. The proposer is also reminded that the DOE cost share percentage cannot exceed 50% of allowable costs by phase for Phases I,II & III and is limited to the same percentage for preaward as the overall DOE cost share percentage for Phases I,II & III.

5.5.2 Proposal Section IV.B - COMMITMENT AND CAPABILITY TO FINANCE THE FIRST BUDGET PERIOD

The first Budget Period consists of the Preaward Activities and the Project Definition Activities (defined in sections 7.2 and 6.1 and 6.3, respectively), if required. However, the proposer may include additional activities in the first Budget Period consistent with the project requirements and the prudent use of DOE funds. If the proposer is including additional activities in the first Budget Period, these activities and the sources of financing required to fund the associated costs must be clearly identified. The first Budget Period funding requirements will be identified in Exhibits D and D.1 of Appendix K along with the funding requirements of the remainder of the SOW activities. During post selection fact finding and negotiation, both DOE and the proposer

may choose to redefine the tasks included in the first Budget Period. Impacts on cost and confirmation of the financial commitment would be reevaluated at that time.

Commitment of the non-DOE funds, subject to reasonable business conditions, for the completion of the activities for the first Budget Period of the project.

The information provided in Exhibits D and D.1 should clearly identify the sources of financing for the first Budget Period of the project. The total amount of financing provided by these sources must be in agreement with the estimated costs in Exhibits A, B and B.1 for the first Budget Period activities.

In addition, the amount of the committed financing should:

1. Represent 100% funding of Preaward costs, since reimbursement by DOE will not occur until after award; and
2. Include the proposed Phase I cost share ratio for Project Definition activities and the cost share ratio of the Phase from which any additional activities are to be included in the first Budget Period.

A representative with the authority to commit funds for each entity identified in Exhibit D.1, should provide a signed statement of the amount and type of funding, and should demonstrate that such funds will be available as needed. These statements are to be included in this section of the proposal. The statements can be subject to reasonable business terms (e.g., successful negotiation of Cooperative Agreement, continued economic attractiveness of project).

If a partnership or joint venture agreement will be formed by the Participants, then a letter of intent to execute such an agreement should also be provided. This letter should outline the "four corners" of the financial terms for providing the funds for the first Budget Period of the proposed SOW activities. The letter must be included in this section of the proposal.

If funds are to be raised externally, the terms of the instrument to raise the funds should be described and a statement should be provided (in this section of the proposal) by the responsible official of the external source, or the underwriter of the financing instrument, committing the identified funds for the first Budget Period.

If funding for the first Budget Period is to be provided through In-Kind Contributions, clearly identify the contributions and provide the information required by Exhibit E in Appendix K for the activities in the Phases or portion of Phases included in the first Budget Period.

The proposer is reminded that funding must be provided in full by the non-DOE sources for the Preaward activities, prior to the award of a Cooperative Agreement. Therefore, funding of the Preaward activities must be committed in full by the funding entities. Reimbursement by DOE is contingent on the execution of a Cooperative Agreement and the approval of the Preaward costs by the DOE contracting officer.

Reasonableness of the proposed costs for the SOW activities for the first Budget Period. Exhibits A through C will be reviewed to determine if the costs proposed for the first Budget Period tasks are reasonable. The proposer should summarize the method or approach of developing the estimate and provide explanations or rationale supporting its legitimacy. The proposer must define the accuracy of the estimate and substantiate the method of estimate development to support this level of accuracy. If applicable, the proposer should provide a discussion of any unique cost saving aspect of the Technical Approach.

Financial condition and capability of the proposed financing sources to provide their respective share of the non-DOE portion of the first Budget Period costs. The proposer must provide financial statements for the reported quarters of the current fiscal year, and audited financial statements for the three most recent fiscal years for each proposed source of equity financing and In-Kind Contributions to the project. If the entity that will be the Participant is providing funds and is not in existence, then provide the same financial

statements (quarterlies and audited annuals) for the same periods for each of the parent or predecessor organizations. If the entity that will be the Participant is currently in existence, but has not been in existence for three continuous years preceding the proposal date, then provide the audited financial statements for both the entity and any parent or predecessor organizations. If the first Budget Period includes operations, then Exhibit F of Appendix K should be completed to provide the basis for the estimated Program Income, if proposed as a source of funding for proposed Project-Specific Variable Operating Costs. The information provided in Exhibit F should be consistent with the information submitted in Exhibit G.

Additional credit will be given for executed financing agreements and specific plans for providing for any potential shortfall in funding the first Budget Period activities. Additional credit will be given to this criterion if the agreements or instruments which provide for the funding of the First Budget period have been completed and executed. Copies of these agreements (e.g. loan, partnership, joint venture, underwriting of financial instruments, etc.) should be included in Volume IV of the proposal. Additional credit also will be given to a proposer that commits to providing for any shortfall in funding needed to accomplish the activities in the SOW for the first Budget Period.

5.5.3 Proposal Section IV.C - FINANCING PLAN AND CAPABILITY TO FINANCE THE REMAINDER OF THE PROJECT

The quality, completeness and reasonableness of the Financing Plan to complete the project will be evaluated under this criterion.

Adequacy and completeness of the plan to finance the remaining Budget Periods for accomplishing the SOW activities for the project. The proposer must submit a Financing Plan for funding the estimated costs for the SOW activities beyond those included in the first Budget Period. Since these remaining Budget Periods will very probably not be defined until post selection, the proposer should address the total financing required by Phase for completing the remainder of

the project. It is not necessary to address financing for an individual Budget Period, especially since the financing for completing the project must be committed at the time a Continuation Application is filed for the second Budget Period. The proposer should complete Appendix K, Exhibits D and D.1, Exhibit F (if Program Income is to be used in the financing Plan for Project-Specific Variable Operating Costs) and Exhibit E (if In-Kind Contributions are involved). It is very important that the funding levels and information in these exhibits agree with the costs and information shown in Exhibits A, B, B.1, C and G.

The proposer is reminded that under the terms of the Cooperative Agreement, Program Income can only be projected as a source of funding for Project-Specific Variable Operating Costs.

In this section of the proposal, include a discussion supporting the Financing Plan that addresses the following:

- o The extent to which the proposer, its parents or other Participants or team members will contribute equity funds to the project and the source(s) of such funds.
- o The nature and extent to which external financing will be required and sought and the prospective source(s) of such funds.
- o The extent to which the proposer will seek state and local grants, loans, industry sponsored research, or other funding; and the source(s) of such funds.
- o The purpose of including In-Kind-Contributions and any incumbrance that may prohibit the use or availability of these contributions.

- o The effect on the project of failing to obtain funds listed in the Financing Plan, Appendix K, Exhibit D.1; also discuss possible alternative sources of funds.
- o The types and estimated fair market value of assets (if any) that the proposer or project team member will pledge as collateral for any outside financing, and identification of those entities which will guarantee the financing and the terms of repayment.
- o The extent to which the expected rate regulatory treatment of the project by State or Federal rate making agencies will impact financing.
- o The rationale for the assumptions supporting the projected Program Income statement and the Project Specific-Variable Costs estimate (stream factors, rate of use of raw materials and chemicals, etc.).

The proposer should discuss the ability to obtain the identified financing for the remainder of the project and should discuss any potential impediments to executing the commitments of the Financing Plan.

Reasonableness of the proposed costs for the SOW activities for these Budget Periods. Exhibits A through C, will be reviewed to determine if the costs proposed for the remaining project tasks are reasonable. The proposer should summarize the method or approach of developing the estimate and provide explanations or rationale supporting its legitimacy.

The proposer must define the accuracy of the estimate and substantiate the method of estimate development to support this level of accuracy. The rates, quantities and assumptions that support Phase III variable operating cost should be provided in Exhibit G to support Exhibit F. If applicable, the proposer should provide a discussion of any unique cost saving aspect of the Technical Approach.

Financial condition and capability of the proposed financing sources to commit the proposed non-DOE share of the project costs prior to the end of the first Budget Period. If there are sources of funding for the remainder of the project that were not involved in the first Budget Period, then provide the same financial information required in section 5.4.2 for these additional sources (e.g., three years of financial statements).

The Cooperative Agreement requires commitment of the entire funding for the project at the filing of the Continuation Application for the second Budget Period. If the first Budget Period is to include more than project definition activities, as defined in Section 6.1 and 6.3, the proposer must have the commitment for the remainder of the project in place at the time of the award.

Alternatively, the Cooperative Agreement can have a decision point during the first Budget Period that occurs after the project definition activities have been completed. If the financing for the entire project has not been committed by this decision point, DOE would have the unilateral right to withdraw from the project prior to initiating activities beyond those necessary for developing sufficient definition to provide a basis for financial commitment. The proposer must demonstrate that the project financing will be committed at the appropriate time (second Budget Period continuation application filing, or award of the Cooperative Agreement) depending on how the first Budget Period is structured.

The proposed funding sources should provide letters (in this section of the proposal) that, as a minimum, state (1) the amount of funding that will be provided or is under consideration by their respective organizations, (2) the conditions, if any, that will impact the decision to commit, and (3) the date by which a decision will be made. If funding is to be provided through a loan, specifically for the project, or if a financial instrument is to be issued, such as shares of stock or bonds, then provide a letter from the underwriter, the source of the loan, or any other source of the funds, describing the terms and conditions for a successful issue and the timing of the issue, as well as the

rationale for why the identified funds can be obtained through the planned means of financing. The proposer should discuss any liabilities, limitations, conditions or other factors which could affect the availability of the funding.

Ability to demonstrate that market agreements can be obtained to provide the revenue (if applicable) for financing the project. If the Project-Specific Variable Operating Costs are to be funded through Program Income then Exhibit F of Appendix K should be completed. The information provided in Exhibit F should be consistent with the information provided in Exhibit G. The proposer must submit evidence that the revenue assumptions and estimates supporting Exhibit F are realistic. This evidence should consist of purchase agreements, letters of intent to purchase, or letters from brokers indicating the marketability and price of the product. If the product is to be a new fuel form or a conventional fuel being used in a new application or a by-product that has not been generally marketed, then strong evidence must be provided of the acceptability of this product or by-product at the projected price. Otherwise the projected Program Income cannot be properly evaluated as financing for the project. If a conventionally accepted product or by-product is to be produced through a new means of production, then the proposer must provide evidence that the estimated Program Income in the Financing Plan is achievable, even if there is the risk of the product not being produced at the conventionally accepted specifications. If the project is to receive Program Income as a result of rentals or service fees, then, as a minimum, a letter of intent describing the terms of payment should be provided (in this section of the proposal) to support the Program Income projections.

Additional credit will be given to financial commitments or executed financing agreements and specific plans for providing for any potential shortfall in funding the completion of the project SOW activities. Additional consideration will be given for this criterion if the source(s) have committed to providing the funds, subject to reasonable business conditions, or if the agreements or instruments which provide for funding the remainder of the project have been completed and executed. Copies of letters from the responsible

officials committing the funding or of the executed agreements (e.g., loan, partnership, joint venture, underwriting of financial instruments) should be included in this section of the proposal. Consideration will also be given to a proposer that commits to providing for any shortfall in funding needed to accomplish the activities in the SOW for the remainder of the project.

5.5.4 Proposal Section IV.D - PROJECT TEAM FINANCIAL RISK

The seriousness of the project team's commitment to the project is demonstrated by the team members' acceptance of a reasonable and significant portion of the financial risk involved in the successful completion of the proposed SOW.

Degree to which financial risk is assumed by members of the Project Team (excluding not-for-profit and government organizations unless these organizations are the Participant) is measured by the level of financing provided by the project team and especially the Participant. The higher the percentage of equity provided by the private sector, the more risk the profit-making organizations assume towards achieving a successful demonstration. For the purpose of this criterion, financing provided by government or not-for-profit organizations (unless the Participant) is not acceptable as evidence of the degree of risk assumed, unless there is an obligation by the team members to repay the financing on commercially competitive terms. If In-Kind Contributions are to be provided by the Project Team, then it must be demonstrated how these contributions are at risk and the value of this risk must be quantified. Contributions of labor, feedstocks and services are evidence of risk at the current value of these items. The Government is encouraging a successful project through the commitment of funds for which the project team members (or parents) are liable. Examples include funds generated internally by the project team members (or parents) and committed to the project, and financing where the holders have recourse against the team members or its parent.

The proposer should discuss the ability and willingness of itself or the Project Team to cost share or wholly fund cost overruns.

Additional credit will be given for the project team cost sharing above the minimum 50% required, particularly in the early phases of the project. The Government encourages cost sharing by the project team of more than the 50% minimum as evidence of commitment.

5.5.5 Proposal Section IV.E - Exceptions, Deviations, and Assumptions

The proposer shall identify and explain exceptions, deviations, or conditional assumptions taken to the requirements of this Volume and the Model Cooperative Agreement. Any exception, deviations, or conditional assumptions taken must contain sufficient explanation and justification to permit evaluation. Numerous exceptions, or one or more significant exceptions, may result in rejection of the proposal as unacceptable. Selection of a proposal for negotiation will not be an indication that DOE accepts the exceptions, deviations, or conditional assumptions contained in the proposal.

6. GOVERNMENT MANAGEMENT PARTICIPATION

6.1 PROJECT INFORMATION FLOW

Successful proposers should note that award of a Cooperative Agreement requires a different level of information from that needed for selection. Soon after notice of selection, these proposers should expect that DOE will request the following information:

- a proposed Repayment Agreement based on the model in Appendix M,
- an updated technical description,
- updated environmental data including the information in Appendix J,
- an updated Financing Plan,
- a preliminary Project Management Plan,
- a detailed cost estimate (see Table 2),
- information concerning intellectual property particularly about technical data,
- more detailed site information, and
- audit data.

This information is necessary before award and to allow DOE to prepare for negotiation of the Cooperative Agreement.

As described in Section 6.3, it is DOE's intent that the first Budget Period of the Cooperative Agreement will be oriented toward baselining the project. In this regard much of the above information will be developed in more detail during these Project Definition Activities. To illustrate this increasing level of information detail, Table 2 describes the minimum level of project definition to support the cost estimate at the completion of negotiations (preaward activities) and at the end of the Project Definition Activities.

TABLE 2

<u>PreAward Activities</u>	<u>Project Definition Activities</u>
<ul style="list-style-type: none"> o preliminary flow diagrams o preliminary overall heat and material balances o preliminary overall utility requirements o plot plans o "phone quotes" and/or historical data and published cost curves for individual major equipment items o factors for total installation including piping, electrical, structural, instrumentation, etc. o factors may be used for battery limits unit processes and auxiliary systems (e.g., coal feed, clean-up, etc.) o schedule depicting major milestones 	<ul style="list-style-type: none"> o final process flow diagrams o detailed unit heat and material balances o preliminary P&ID's for process and auxiliary units o equipment list with process and mechanical specifications o vendor quotations for major equipment (recent but not necessarily competitive) o bulk materials take-offs o preliminary engineering for foundations, structures, site preparation o preliminary general arrangement layout and elevation drawings o instrument list o piping specifications o factored cost estimate for total installation on bulk takeoffs o detailed cost escalation estimate o detailed project schedule o complete environmental submissions for DOE's NEPA process o commit all financing for the project

6.2 POST-SELECTION NEGOTIATIONS

If negotiations do not proceed in a timely manner, DOE may end negotiations (i.e., deselect that project). The circumstances under which DOE may deselect a project include, but are not limited to, the following:

- o DOE determines that the prospective Participant is not meeting the agreed upon negotiation milestones.
- o DOE determines that the prospective Participant is unable or unwilling to meet its financial commitment to the project.
- o DOE determines, after completion of the NEPA process, that adverse environmental impacts cannot adequately be mitigated.
- o DOE determines that information in the proposal that was significant to selection was incorrect or untrue.
- o Negotiations reach an impasse.
- o The proposed site is no longer available and an alternative site, acceptable to DOE, has not been identified.
- o The prospective Participant withdraws its proposal.

6.3 PROJECT DECISION MAKING

DOE intends that the Participant will manage any project resulting from this PON; these projects will not be Government-directed. DOE must be in a position, however, to assure both the meeting of project goals and the proper use of public funds. As a result, the Government role in project execution is to monitor project activities, give technical advice, assess progress by periodically reviewing project performance with the Participant, and participate in decision

making at major project junctures. Appendix L (the Model Cooperative Agreement) details the reporting requirements, the limits on DOE technical advice, and how DOE will treat sensitive and proprietary information.

The Model Cooperative Agreement also delineates the role that DOE will play in project decision making. Every project will be subdivided into several budget periods, each of which will end with a decision point. The exact number of budget periods will be determined on a case-by-case basis during negotiation. At the start of each budget period, the Participant will deliver a Project Evaluation Plan for DOE's approval. This document will detail the expected progress for the upcoming budget period and will contain more detail than, but be consistent with, the Statement of Work in the Cooperative Agreement. At the end of each budget period, the Participant will deliver a Project Evaluation Report. This report will present a description of project progress. If the Participant intends to continue the project, it will also submit a Continuation Application at that time. DOE will not unreasonably withhold approval of the Continuation Application (see Appendix L, Articles VIII and IX). The Project Evaluation Plan and Project Evaluation Report are not required for the last budget period of the project.

The first Budget Period will include Project Definition Activities, unless DOE has determined during prenegotiation fact finding that the items listed below exist in sufficient detail to baseline the Project. With the completion of the Project Definition Activities the project should have matured to the point that prudent planning allows for the implementation of proper management controls. In this regard the Project Evaluation Plan for the first Budget Period will include the accomplishment of at least the items listed below:

- o Project Management Plan - the Plan described in the Model Cooperative Agreement will be prepared and delivered to DOE,
- o Technology Baseline - all decisions about flowsheets, specific equipment types, equipment placement, and demonstration configuration will be made, and technical definition is at least at the level of detail described in Table 2, Section 6-1,

- o Schedule Baseline - the schedule will be of sufficient detail to allow cost estimating to the level of detail discussed in Section 6.1,
- o Cost Baseline - the estimate will be of a quality and accuracy supported by the level of project definition in Section 6.1,
- o Financing - all financial commitments pertaining to the non-DOE share of total project costs will be signed and implemented, and
- o NEPA - all requested information for DOE to satisfy its responsibility under the National Environmental Policy Act (see Sections 3.26 and 7.11) will have been submitted and the NEPA process will be completed or near to completion.

6.4 PROTECTION OF CERTAIN CONTRACT DATA

The DOE, for a period of up to five (5) years after completion of the operations phase of a cooperative agreement, may provide appropriate protections including exemptions from subchapter II of Chapter 5 of Title 5, United States Code, against the dissemination of certain information that results from projects awarded under this solicitation. Such information will be protected if it would constitute:

- (1) a trade secret, or
- (2) commercial or financial information that is privileged or confidential,

if the information had been obtained from and first produced by a non-Federal party.

7. GOVERNMENT FINANCIAL PARTICIPATION

This section specifies the significant financial policies and guidelines upon which Government assistance under this PON will be determined.

7.1 AMOUNT OF COST SHARING REQUIRED

- o DOE shall not finance more than 50 percent of the total allowable costs of the project as estimated by DOE as of the date of award of financial assistance. In addition, the Participant must cost share by phase at least 50 percent in "Preaward" activities, Phase I - "Design," Phase II - "Construction," and Phase III - "Operation."
- o Preaward costs will be reimbursed only upon DOE's signing of the Cooperative Agreement and only in the same ratio as the cost sharing for the total project.
- o Postaward costs will be shared between DOE and the Participant on an "as expended", dollar-for-dollar, basis.

7.2 ALLOWABLE PREAWARD COSTS FOR COST SHARING

Allowable Preaward costs will be reimbursed in the same ratio as the cost share for the Project. This reimbursement will occur only upon DOE's signing of the Cooperative Agreement. For purposes of the preparation of the cost proposal, the proposer should identify these costs as Preaward costs. If DOE and the proposer execute a Cooperative Agreement, Preaward costs will be allowable to the extent they are related to the following.

- o The costs incurred between selection and award in the preparation of material requested by the DOE Contracting Officer for the negotiation of the Cooperative Agreement.

- o DOE will recognize as direct costs, the costs incurred to acquire and deliver the environmental information generated by the proposer during the period between selection and award. Of this environmental information, only the information delivered to and accepted by DOE in satisfying the requirements of the post-selection site-specific NEPA process (see section 3.26.3 and Appendix J) will be recognized for cost sharing purposes.

7.3 ALLOWABLE PROJECT COSTS FOR COST SHARING

Allowable direct and indirect project costs are determined by the cost principles applicable to the award. Proposed project costs should be specifically related to the proposed demonstration as defined in the SOW. In addition to the cost principles, the following should be used as guidance in preparing the Cost and Finance proposal.

- o If the current cost of operation at an existing facility, such as coal, labor or other costs, is increased as a direct result of the proposed project, only the incremental increase of such costs will be allowable during the course of the project.
- o If legitimate circumstances do not exist which would justify otherwise, the cost or value of new or existing equipment or facilities proposed for the project will be prorated for the purposes of cost sharing unless the item is dedicated only to the Demonstration Project and the size is not greater than that necessary for the demonstration (see Section 5.3.3.3).
- o The value that will be allowed for contributions of currently depreciating property, which are of relevance to the proposed project, is the depreciation schedule being used and allowed under statute or IRS regulations for such property. This depreciation will be limited in its cost share value to the depreciation claimed during

the life of the Demonstration Project. For contributions of property by tax exempt organizations, a fair use value will be assigned to the property equivalent to the value that would be assigned were the owner not tax exempt.

- o For fully depreciated property contributed to the project and in continuous use during the entire calendar year 1990, a fair use value for the life of the project will be assigned by DOE. The fair use value will be the annual average depreciation used by the proposer as permitted under statute or IRS regulations under which it was depreciated.
- o Contributed land will be valued at its fair rental value for the period of the demonstration.
- o Contributed land, equipment and facilities will be counted as cost sharing only for the periods during which they are brought into use for this project. For example, that portion of a facility used for housing the design team may be credited as a cost share during Phase I, but contributed equipment incorporated in the construction may be credited as a cost share only during those portions of Phases II and III when used. Property owned by one of the project team members and made available to the project will be valued according to the principles described above.
- o Value for contributed equipment and facilities will be assigned only to the extent that the facility or equipment is project-related.
- o The cost of disposal of the equipment and facility is an allowable cost if proposed and if accomplished during Phase III of the Cooperative Agreement.

7.4 UNALLOWABLE PROJECT COSTS FOR COST SHARING

In addition to the cost principles applicable to the award, the following should be used as guidance in preparing the cost proposal.

- o DOE shall not accept valuation for property sold, transferred, exchanged, or manipulated in any way to acquire a new basis for depreciation purposes or to establish a rental value in circumstances which would amount to a transaction for the mere purpose of responding to this PON.
- o DOE will not cost share in both the direct cost and depreciation on the same item. Depreciation is not allowable for cost sharing on any item previously charged to the project as a direct cost. For example, DOE will cost share the direct cost on equipment or facilities purchased or constructed for the project and charged as a direct cost to the project but will not also cost share in the depreciation.
- o Interest on borrowings (however represented) and other financial costs such as bond discounts, costs of financing and refinancing capital (net worth plus long-term liabilities), are unallowable project costs and will not be cost shared. This includes interest on funds borrowed for construction.
- o Facilities Capital Cost of Money (FCCM) as used in Federal procurement actions, shall be an unallowable cost on all real property or equipment acquired by or on behalf of the Participant in connection with the performance of the project. However, pre-existing FCCM charges are eligible costs.

- o Existing facilities, equipment, and supplies, or previously expended research or development funds are not cost sharing for the purposes of this PON, except as amortized, depreciated, or expensed in normal business practice.
- o Fully depreciated property will not receive any cost sharing value unless it has been in continuous use by the proposer during the entire calendar year 1990.
- o Foregone fees, profits, or revenues as well as replacement power costs are not allowable costs. Such costs shall not, therefore, qualify as cost sharing, nor will DOE pay any portion of such costs.
- o Fee or profit will not be paid to any member of the Project Team, its affiliates or parents, having a substantial and direct interest in the commercialization of the demonstration technology. Competitive subcontracts placed with the prior written consent of the contracting officer and subcontracts for routine supplies and services are not covered by this prohibition.
- o Patents, proprietary data, or prior work will not be valued in determining the Participant's cost share in the project.
- o Allowable costs under past, present or future government contracts, agreements or grants will not be charged against the Cooperative Agreement. Likewise, the Participant may not charge allowable costs of this project, including its share of cost participation, to the Federal Government under other contracts, agreements, or grants.

7.5 ALLOWABLE NON-DOE FUNDING

Cost sharing may be accomplished by means of cash or In-Kind Contributions made to satisfy allowable direct or indirect costs (See Section 7.3).

7.6 LIMITATIONS ON SOURCES OF NON-DOE FUNDING

The following limitations apply to the source of Non-DOE funding that may be offered in the proposal and that may be provided by the Participant.

- o Revenues or royalties from prospective operation of the project, beyond the time considered in the award of financial assistance (i.e., after the end of the Cooperative Agreement) or proceeds from the prospective sale of the assets of the project, or revenues or royalties from replication of the technology in future projects or plants, will not be considered cost sharing.
- o Appropriated Federal funds other than the DOE cost share are not allowable as a source of funding for the purposes of this PON.
- o Notwithstanding 10 CFR § 600.113, Program Income may be used for any purpose. The amount of estimated project revenues, however, that the proposer may identify as a source of funds in its Financing Plan (Appendix K, Exhibit D) cannot exceed the Participant's share of Project-Specific Variable Operating Costs that will be incurred during Phase III (Operation).

7.7 RECOVERY OF GOVERNMENT'S INVESTMENT

Replication of the demonstrated technologies is the objective of the Clean Coal Program. It is the policy of the DOE to recover an amount up to (i.e., not to exceed) the Government's actual contribution to the Project. Repayment will derive from those projects which are successful and achieve commercial application. Individual Repayment Agreements for each project will be negotiated. The following points will serve as the basis for these Agreements.

- o The Government's right to recover its contribution shall continue until either the Government has recouped its contribution or 20 years have elapsed from the effective date of the Repayment Agreement (See Appendix M).
- o The Repayment Agreement shall remain in effect unless the Secretary of Energy or designee determines that such repayment places the Participant at a competitive disadvantage in domestic or international markets. The Participant's request for this determination will not be considered before the effective date of the Repayment Agreement.
- o Any unpaid amount remaining at the end of the 20 year period will be forgiven by the Government.
- o Repayment shall only apply to that portion of the technology identified as being inside the technology envelope. This envelope should be the same as that used in the negotiated clauses dealing with Rights in Technical Data for large businesses. For small businesses where such technical data provisions are not included, the technical envelope for repayment will be defined during negotiations.

- o Repayment will be generated only from the revenue sources specified in the negotiated Repayment Agreement (i.e., corporate assets are not pledged to the repayment).
- o Repayment shall be based on the following potential sources of revenue arising from the commercialization of the demonstrated technology:
 - 1/2% of gross revenues from the sale or lease of equipment that is manufactured and embodies the demonstrated technology and
 - 5% of gross fees resulting from the licensing of the demonstrated technology.
- o Successful proposers may provide an alternative plan during negotiations whereby any revenue source may be used to provide payment that, on an annual basis, is equivalent to the revenue which would be realized from the two sources listed above. Once the alternative plan has been agreed to, the Participant shall have the option to use the alternative plan as the sole basis for repayment or provide documentation on sales and licensing so that the amount repaid the Government shall not exceed, on an annual basis, the revenue realized from the above two sources.
- o To promote commercialization, negotiators may agree that a grace period from repayment may be appropriate to facilitate introduction of the technology into the marketplace. This grace period may be for a set period, a certain number of facilities, or a certain number of licenses. The terms for any grace period shall be developed during negotiations but will not exceed five years or 10% of

projected sales during the repayment period, whichever is less. The entire duration of any negotiated grace period will be part of the 20 year repayment period.

- o Repayment is limited to facilities and applications in the United States.

7.8 COST OVERRUNS

The Government is under no obligation to share any cost overruns. The Government may, however, at its own discretion, share in the cost of overruns, if funds are available. When funds are available and Federal assistance for overruns is provided, the Government share of overruns (i.e., costs incurred during the project that are more than those estimated at the date of award of the original financial assistance agreement) will not exceed the cost share for the overall project and then only up to 25 percent of the original Government contribution as specified in the initial financial assistance agreement.

7.9 PROJECT PROPERTY

The decision of whether to dispose of the facility at the end of the cost-shared project or to continue operating the facility at the Participant's expense is solely the responsibility of the Participant. Proceeds from the sale of project property may be retained by the Participant.

7.10 FINANCIAL RECORDS

Participants in Cooperative Agreements are required to maintain financial records adequate to reflect the nature and extent of their costs and to ensure that the required cost participation is achieved.

7.11 LIMITATION OF GOVERNMENT FINANCIAL PARTICIPATION

DOE cost sharing may be limited by the NEPA regulations at 40 CFR Part § 1506.1 (limitation on actions during NEPA process).

APPENDIX A

CONGRESSIONAL GUIDANCE

One Hundred First Congress of the United States of America

AT THE SECOND SESSION

Began and held at the City of Washington on Tuesday, the twenty-third day of January, one thousand nine hundred and ninety

An Act

Making appropriations for the Department of the Interior and related agencies for the fiscal year ending September 30, 1991, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the Department of the Interior and related agencies for the fiscal year ending September 30, 1991, and for other purposes, namely:

TITLE I—DEPARTMENT OF THE INTERIOR

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

The first paragraph under this head in Public Law 101-121 is amended by striking "\$600,000,000 shall be made available on October 1, 1990, and shall remain available until expended, and \$600,000,000 shall be made available on October 1, 1991, and shall remain available until expended" and inserting "\$600,000,000 shall be made available as follows: \$35,000,000 on September 1, 1991, \$315,000,000 on October 1, 1991, and \$250,000,000 on October 1, 1992, all such sums to remain available until expended for use in conjunction with a separate general request for proposals, and \$600,000,000 shall be made available as follows: \$150,000,000 on October 1, 1991, \$225,000,000 on October 1, 1992, and \$225,000,000 on October 1, 1993, all such sums to remain available until expended for use in conjunction with a separate general request for proposals": *Provided*, That these actions are taken pursuant to section 202(b)(1) of Public Law 100-119 (2 U.S.C. 909); *Provided further*, That a fourth general request for proposals shall be issued not later than February 1, 1991, and a fifth general request for proposals shall be issued not later than March 1, 1992; *Provided further*, That project proposals resulting from such solicitations shall be selected not later than eight months after the date of the general request for proposals; *Provided further*, That for clean coal solicitations required herein, provisions included for the repayment of government contributions to individual projects shall be identical to those included in the Program Opportunity Notice (PON) for Clean Coal Technology III (CCT-III) Demonstration Projects (solicitation number DE-PS01-89 FE 61825), issued by the Department of Energy on May 1, 1989; *Provided further*, That funds provided under this head in this or any other appropriations Act shall be expended only in accordance with the provisions governing the use of such funds contained under this head in this or any other appropriations Act.

With regard to funds made available under this head in this and previous appropriations Acts, unobligated balances excess to the needs of the procurement for which they originally were made available may be applied to other procurements for use on projects for which cooperative agreements are in place, within the limitations and proportions of Government financing increases currently allowed by law: *Provided*, That the Department of Energy, for a period of up to five (5) years after completion of the operations phase of a cooperative agreement may provide appropriate protections, including exemptions from subchapter II of chapter 5 of title 5, United States Code, against the dissemination of information that results from demonstration activities conducted under the Clean Coal Technology Program and that would be a trade secret or commercial or financial information that is privileged or confidential if the information had been obtained from and first produced by a non-Federal party participating in a Clean Coal Technology project: *Provided further*, That, in addition to the full-time permanent Federal employees specified in section 803 of Public Law 97-257, as amended, no less than 90 full-time Federal employees shall be assigned to the Assistant Secretary for Fossil Energy for carrying out the programs under this head using funds available under this head in this and any other appropriations Act and of which 85 shall be for PETC and 80 shall be for METC: *Provided further*, That reports on projects selected by the Secretary of Energy pursuant to authority granted under this heading which are received by the Speaker of the House of Representatives and the President of the Senate less than 30 legislative days prior to the end of the second session of the 101st Congress shall be deemed to have met the criteria in the third proviso of the fourth paragraph under the heading "Administrative provisions, Department of Energy" in the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in Public Law 99-190, upon expiration of 30 calendar days from receipt of the report by the Speaker of the House of Representatives and the President of the Senate or at the end of the session, whichever occurs later.

MAKING APPROPRIATIONS FOR THE DEPARTMENT OF THE INTERIOR
AND RELATED AGENCIES FOR THE FISCAL YEAR ENDING SEPTEMBER
30, 1991, AND FOR OTHER PURPOSES

OCTOBER 27, 1990.—Ordered to be printed

Mr. YATES, from the committee of conference,
submitted the following

CONFERENCE REPORT

[To accompany H.R. 5769]

The committee of conference on the disagreeing votes of the two Houses on the amendment of the Senate to the bill (H.R. 5769) "making appropriations for the Department of the Interior and related agencies for the fiscal year ending September 30, 1991, and for other purposes," having met, after full and free conference, have agreed to recommend and do recommend to their respective Houses as follows:

That the Senate recede from its amendments numbered 12, 16, 20, 25, 26, 28, 32, 33, 36, 38, 41, 53, 54, 56, 57, 59, 65, 66, 102, 104, 109, 120, 127, 129, 133, 134, 135, 137, 142, 143, 153, 156, 161, 177, 181, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 212, 213, 214, 218, and 222.

That the House recede from its disagreement to the amendments of the Senate numbered 2, 3, 7, 8, 18, 21, 31, 35, 39, 42, 43, 46, 60, 61, 62, 67, 68, 69, 71, 76, 77, 81, 83, 84, 85, 86, 87, 88, 111, 112, 115, 122, 123, 124, 125, 126, 132, 138, 139, 140, 141, 145, 146, 148, 150, 151, 154, 159, 162, 163, 165, 169, 172, 173, 175, 182, 184, 190, 210, 211, and 215 and agree to the same.

**DEPARTMENT OF ENERGY
CLEAN COAL TECHNOLOGY**

Amendment No. 142: Provides \$35,000,000 for clean coal technology on September 1, 1991 as proposed by the House instead of \$100,000,000 as proposed by the Senate. This amendment and Amendment No. 143 shift the availability of \$65,000,000 from fiscal year 1991 to fiscal year 1992.

Amendment No. 143: Provides \$315,000,000 for clean coal technology on October 1, 1991 as proposed by the House instead of \$250,000,000 as proposed by the Senate. This amendment and Amendment No. 142 shift the availability of \$65,000,000 from fiscal year 1991 to fiscal year 1992.

Amendment No. 144: Provides dates for two solicitations for clean coal technology as proposed by the Senate. The date for CCT-IV is amended to February 1, 1991 from January 1, 1991. The date for CCT-V is not changed from the Senate date of March 1, 1992.

The managers have agreed to a February 1, 1991 date for the next solicitation to enable the Department to publish a draft solicitation for comment by interested parties. It is expected that there will be changes to evaluation criteria and other factors that make it imperative that potential proposers have an opportunity to comment on the content of the solicitation.

The managers urge the Department to include potential benefits to remote, import-dependent sites as a program policy factor in evaluating proposals. The Department should also consider projects which can provide multiple fuel resource options for regions which are more than seventy-five percent dependent on one fuel form for total energy requirements.

Amendment No. 145: Requires selection of projects within eight months of the requests for proposals required by Amendment No. 144 as proposed by the Senate. The House had no such provision.

Amendment No. 146: Requires repayment of government contributions to projects under conditions identical to the most recent clean coal solicitation as proposed by the Senate. The House had no such provision.

Amendment No. 147: Provides that funds for clean coal technology may be expended only under conditions contained in appropriations Acts. The Senate language had prohibited geographic restrictions on the expenditure of funds. The House had no such provision. The managers direct that no preferential consideration be given to any project referenced explicitly or implicitly in other legislation.

The managers agree to delete bill language dealing with geographic restrictions based on such restrictions being deleted from clean air legislation.

Amendment No. 148: Earmarks employees to two fossil energy technology centers as proposed by the Senate. The House had no such provision. The managers agree that the earmarks for PETC and METC are minimum levels and may be increased as necessary.

The managers agree that no more than the current 30 fulltime equivalent positions from fossil energy research and development may be used in the clean coal program in fiscal year 1991.

101ST CONGRESS
2D SESSION

H. R. 5769

IN THE HOUSE OF REPRESENTATIVES

OCTOBER 24, 1990

Ordered to be printed with the amendments of the Senate numbered

AN ACT

Making appropriations for the Department of the Interior and related agencies for the fiscal year ending September 30, 1991, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the Department of the Interior and related agencies for the fiscal year ending September 30, 1991, and for other purposes, namely:

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

The first paragraph under this head in Public Law 101-121 is amended by striking "\$600,000,000 shall be made available on October 1, 1990, and shall remain available until expended, and \$600,000,000 shall be made available on October 1, 1991, and shall remain available until expended" and inserting "\$600,000,000 shall be made available as follows: ~~(142)~~ ~~\$35,000,000~~ \$100,000,000 on September 1, 1991, ~~(143)~~ ~~\$215,000,000~~ \$250,000,000 on October 1, 1991, and \$250,000,000 on October 1, 1992, all such sums to remain available until expended for use in conjunction with a separate general request for proposals, and \$600,000,000 shall be made available as follows: \$150,000,000 on October 1, 1991, \$225,000,000 on October 1, 1992, and \$225,000,000 on October 1, 1993, all such sums to remain available until expended for use in conjunction with a separate general request for proposals": *Provided*, That these actions are taken pursuant to section 202(b)(1) of Public Law 100-119 (2 U.S.C. 909) ~~(144)~~: *Provided further*, That a fourth general request for proposals shall be issued not later than January 1, 1991, and a fifth general request for proposals shall be issued not later than March 1, 1992 ~~(145)~~: *Pro-*

vided further, That project proposals resulting from such solicitations shall be selected not later than eight months after the date of the general request for proposals (146): Provided further, That for clean coal solicitations required herein, provisions included for the repayment of government contributions to individual projects shall be identical to those included in the Program Opportunity Notice (PON) for Clean Coal Technology III (CCT-III) Demonstration Projects (solicitation number DE-PS01-89 FE 61825), issued by the Department of Energy on May 1, 1989 (147): Provided further, That none of the funds provided under this head in this or any other Act may be used to restrict the geographic area of eligibility for all or any portion of such funds to any area other than the United States.

With regard to funds made available under this head in this and previous appropriations Acts, unobligated balances excess to the needs of the procurement for which they originally were made available may be applied to other procurements for use on projects for which cooperative agreements are in place, within the limitations and proportions of Government financing increases currently allowed by law: *Pro-*

vided, That the Department of Energy, for a period of up to five (5) years after completion of the operations phase of a cooperative agreement may provide appropriate protections, including exemptions from subchapter II of chapter 5 of title 5, United States Code, against the dissemination of information that results from demonstration activities conducted under the Clean Coal Technology Program and that would be a trade secret or commercial or financial information that is privileged or confidential if the information had been obtained from and first produced by a non-Federal party participating in a Clean Coal Technology project: *Provided further*, That, in addition to the full-time permanent Federal employees specified in section 303 of Public Law 97-257, as amended, no less than 90 full-time Federal employees shall be assigned to the Assistant Secretary for Fossil Energy for carrying out the programs under this head using funds available under this head in this and any other appropriations Act (148) *and of which 35 shall be for PETC and 30 shall be for METC*: *Provided further*, That reports on projects selected by the Secretary of Energy pursuant to authority granted under this heading which are received by the Speaker of the House of Representatives and the President of the Senate less than 30 legislative days prior to the end of the second session of the 101st Congress shall be deemed to have met the criteria in the third proviso of the fourth paragraph under

the heading "Administrative provisions, Department of Energy" in the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in Public Law 99-190, upon expiration of 30 calendar days from receipt of the report by the Speaker of the House of Representatives and the President of the Senate or at the end of the session, whichever occurs later.

FOSSIL ENERGY RESEARCH AND DEVELOPMENT

For necessary expenses in carrying out fossil energy research and development activities, under the authority of the Department of Energy Organization Act (Public Law 95-91), including the acquisition of interest, including defeasible and equitable interests in any real property or any facility or for plant or facility acquisition or expansion, ~~(149)~~ ~~\$448,258,000~~ \$459,322,000, to remain available until expended, of which \$267,000 is for the functions of the Office of the Federal Inspector for the Alaska Natural Gas Transportation System established pursuant to the authority of Public Law 94-586 (90 Stat. 2908-2909) and of which ~~(150)~~ ~~\$3,160,000~~ \$2,969,000 is for the fuels program ~~(151)~~,—and of which \$2,000,000 is for a cooperative research program with States: *Provided*, That no part of this appropriation shall be used to pay more than one-half the cost of any project carried on in the above-mentioned cooperative research program: *Provided further*, That no part of the sum herein made available shall be used for the

Public Law 101-302
101st Congress

An Act

Making dire emergency supplemental appropriations for disaster assistance, food stamps, unemployment compensation administration, and other urgent needs, and transfers, and reducing funds budgeted for military spending for the fiscal year ending September 30, 1990, and for other purposes.

May 25, 1990
[H.R. 4404]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, to provide dire emergency supplemental appropriations for the fiscal year ending September 30, 1990, and for other purposes, namely:

Dire Emergency Supplemental Appropriation for Disaster Assistance, Food Stamps, Unemployment Compensation Administration, and Other Urgent Needs, and Reducing Funds Budgeted for Military Spending Act of 1990.

**TITLE II—SUPPLEMENTAL
APPROPRIATIONS**

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

Funds previously appropriated under this head for clean coal technology solicitations to be issued no later than June 1, 1990, and no later than September 1, 1991, respectively, shall not be obligated until September 1, 1991: *Provided*, That the aforementioned solicitations shall not be conducted prior to the ability to obligate these funds: *Provided further*, That pursuant to section 202(b) of the Balanced Budget and Emergency Deficit Control Reaffirmation Act of 1987, this action is a necessary (but secondary) result of a significant policy change: *Provided further*, That for the clean coal solicitations identified herein, provisions included for the repayment of government contributions to individual projects shall be identical to those included in the Program Opportunity Notice (PON) for Clean Coal Technology III (CCT-III) Demonstration Projects (solicitation number DE-PSO1-89 FE 61825), issued by the Department of Energy on May 1, 1989.

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

For necessary expenses of, and associated with, Clean Coal Technology demonstrations pursuant to 42 U.S.C. 5901 et seq., \$600,000,000 shall be made available on October 1, 1990, and shall remain available until expended, and \$600,000,000 shall be made available on October 1, 1991, and shall remain available until expended: *Provided*, That projects selected pursuant to a separate general request for proposals issued pursuant to each of these appropriations shall demonstrate technologies capable of replacing, retrofitting or repowering existing facilities and shall be subject to all provisos contained under this head in Public Laws 99-190, 100-202, and 100-446 as amended by this Act: *Provided further*, That the general request for proposals using funds becoming available on October 1, 1990, under this paragraph shall be issued no later than June 1, 1990, and projects resulting from such a solicitation must be selected no later than February 1, 1991: *Provided further*, That the general request for proposals using funds becoming available on October 1, 1991, under this paragraph shall be issued no later than September 1, 1991, and projects resulting from such a solicitation must be selected no later than May 1, 1992.

102 Stat. 1810.

The first paragraph under this head in Public Law 100-446 is amended by striking "\$575,000,000 shall be made available on October 1, 1989" and inserting "\$450,000,000 shall be made available on October 1, 1989, and shall remain available until expended, and \$125,000,000 shall be made available on October 1, 1990": *Provided*, That these actions are taken pursuant to section 202(b)(1) of Public Law 100-119 (2 U.S.C. 909).

With regard to funds made available under this head in this and previous appropriations Acts, unobligated balances excess to the needs of the procurement for which they originally were made available may be applied to other procurements for which requests for proposals have not yet been issued: *Provided*, That for all procurements for which project selections have not been made as of the date of enactment of this Act no supplemental, backup, or contingent selection of projects shall be made over and above projects originally selected for negotiation and utilization of available funds: *Provided further*, That reports on projects selected by the Secretary of Energy pursuant to authority granted under this heading which are received by the Speaker of the House of Representatives and the President of the Senate less than 30 legislative days prior to the end of the first session of the 101st Congress shall be deemed to have met the criteria in the third proviso of the fourth paragraph under the heading "Administrative provisions, Department of Energy" in the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in Public Law 99-190, upon expiration of 30 calendar days from receipt of the report by the Speaker of the House of Representatives and the President of the Senate or at the end of the session, whichever occurs later.

Reports.

42 USC 8814
note.

Unobligated balances available in the "Alternative fuels production" account may hereafter be used for payment of the guaranteed portion of defaulted loans and associated costs of the Department of Energy Alcohol Fuels Loan Guarantee program, subject to the determination by the Secretary of Energy that such unobligated funds are not needed for carrying out the purposes of the Alternative Fuels Production program: *Provided*, That the use of these unobligated funds for payment of defaulted loans and associated costs shall be available only for loans guaranteed prior to January 1, 1987: *Provided further*, That such funds shall be used only after the unobligated balance in the Department of Energy Alcohol Fuel Loan Guarantee reserve has been exhausted.

Contracts.

Annual appropriations made in this Act and previous Interior and Related Agencies Appropriations Acts shall be available for obligations in connection with contracts issued by the Department of Energy for supplies and services for periods not in excess of twelve months beginning at any time during the fiscal year.

ADMINISTRATIVE PROVISIONS, DEPARTMENT OF ENERGY

Appropriations under this Act for the current fiscal year shall be available for hire of passenger motor vehicles; hire, maintenance, and operation of aircraft; purchase, repair, and cleaning of uniforms; and reimbursement to the General Services Administration for security guard services.

From appropriations under this Act, transfers of sums may be made to other agencies of the Government for the performance of work for which the appropriation is made.

None of the funds made available to the Department of Energy under this Act shall be used to implement or finance authorized price support or loan guarantee programs unless specific provision is made for such programs in an appropriations Act.

The Secretary is authorized to accept lands, buildings, equipment, and other contributions from public and private sources and to prosecute projects in cooperation with other agencies, Federal, State, private, or foreign: *Provided*, That revenues and other moneys received by or for the account of the Department of Energy or otherwise generated by sale of products in connection with projects of the Department appropriated under this Act may be retained by the Secretary of Energy, to be available until expended, and used only for plant construction, operation, costs, and payments to cost-sharing entities as provided in appropriate cost-sharing contracts or agreements: *Provided further*, That the remainder of revenues after the making of such payments shall be covered into the Treasury as miscellaneous receipts: *Provided further*, That any contract, agreement, or provision thereof entered into by the Secretary pursuant to this authority shall not be executed prior to the expiration of 30 calendar days (not including any day in which either House of Congress is not in session because of adjournment of more than three calendar days to a day certain) from the receipt by the Speaker of the House of Representatives and the President of the Senate of a full comprehensive report on such project, including the facts and circumstances relied upon in support of the proposed project.

Gifts and
property.

Contracts.
Reports.

The Secretary of Energy may transfer to the Emergency Preparedness appropriation such funds as are necessary to meet any unforeseen emergency needs from any funds available to the Department of Energy from this Act.

Loans.
42 USC 8814
note.

Notwithstanding 31 U.S.C. 3302, funds derived from the sale of assets as a result of defaulted loans made under the Department of Energy Alcohol Fuels Loan Guarantee program, or any other funds received in connection with this program, shall hereafter be credited to the Biomass Energy Development account, and shall be available solely for payment of the guaranteed portion of defaulted loans and associated costs of the Department of Energy Alcohol Fuels Loan Guarantee program for loans guaranteed prior to January 1, 1987

42 USC 8814
note.

Unobligated balances available in the "Alternative fuels production" account may hereafter be used for payment of the guaranteed portion of defaulted loans and associated costs of the Department of Energy Alcohol Fuels Loan Guarantee program, subject to the determination by the Secretary of Energy that such unobligated funds are not needed for carrying out the purposes of the Alternative Fuels Production program: *Provided*, That the use of these unobligated funds for payment of defaulted loans and associated costs shall be available only for loans guaranteed prior to January 1, 1987: *Provided further*, That such funds shall be used only after the unobligated balance in the Department of Energy Alcohol Fuel Loan Guarantee reserve has been exhausted.

Contracts.

Annual appropriations made in this Act and previous Interior and Related Agencies Appropriations Acts shall be available for obligations in connection with contracts issued by the Department of Energy for supplies and services for periods not in excess of twelve months beginning at any time during the fiscal year.

MAKING APPROPRIATIONS FOR THE DEPARTMENT OF THE INTERIOR
AND RELATED AGENCIES FOR THE FISCAL YEAR ENDING SEPTEMBER
30, 1990, AND FOR OTHER PURPOSES

OCTOBER 2, 1989.—Ordered to be printed

Mr. YATES, from the committee of conference,
submitted the following

CONFERENCE REPORT

[To accompany H.R. 2788]

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

Amendment No. 112: Reported in technical disagreement. The managers on the part of the House will offer a motion to recede and concur in the amendment of the Senate which adds the word "replacing" to the definition of clean coal technology. The managers agree that the inclusion of "replacing" for clean coal IV and V is intended to cover the complete replacement of an existing facility if, because of design or site specific limitations, repowering or retrofitting of the plant is not a desirable option.

Amendment No. 113: Appropriates \$450,000,000 for fiscal year 1990 for clean coal technology instead of \$500,000,000 as proposed by the House and \$325,000,000 as proposed by the Senate. This appropriation along with \$125,000,000 provided for fiscal year 1991 in Amendment 114 fully funds the third round of clean coal technology projects. The managers agree that additional manpower is required, particularly at the Department's Energy Technology Centers, in order to manage adequately the increased workload from the accumulation of active clean coal technology projects and the inclusion of additional procurements in this bill. Although a legislative floor is not included, the managers agree that at least eighty personnel will be required in addition to the approximately thirty FTE's now included in the fossil energy research and development appropriation. The managers agree further that funds from the fossil energy research and development appropriation should not be used to pay the cost of more than the equivalent FTE's paid under that account in fiscal year 1989.

Amendment No. 114: Reported in technical disagreement. The managers on the part of the House will offer a motion to recede and concur in the amendment of the Senate with an amendment as follows:

In lieu of the matter stricken and inserted by said amendment, insert: *and shall remain available until expended, and \$125,000,000*

The managers on the part of the Senate will move to concur in the amendment of the House to the amendment of the Senate. The amendment provides \$125,000,000 in fiscal year 1991 for the third clean coal technology procurement instead of \$75,000,000 as proposed by the House and \$100,000,000 as proposed by the Senate.

Amendment No. 115: Deletes Senate proposed appropriation of \$150,000,000 for fiscal year 1992 for clean coal technology. The House proposed no such appropriation.

Amendment No. 116: Restores House language stricken by the Senate which prohibits the use of supplemental, backup, or contingent project selections in clean coal technology procurements.

Amendment No. 117: Restores the word "further" stricken by the Senate.

DEPARTMENT OF THE INTERIOR AND RELATED
AGENCIES APPROPRIATIONS BILL, 1990

JULY 25 (legislative day JANUARY 3), 1989.—Ordered to be printed

Mr. BYRD, from the Committee on Appropriations,
submitted the following

REPORT

[To accompany H.R. 2788]

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

Appropriations, 1989.....	\$190,000,000
Budget estimate, 1990.....	710,000,000
House allowance	635,000,000
Committee recommendation.....	460,000,000

The Committee recommends an appropriation of \$460,000,000, a decrease of \$250,000,000 below the budget estimate and \$175,000,000 below the House allowance.

The Committee supports the full \$2,500,000,000 Federal funding level for the Clean Coal Technology Program as well as the solicitation schedule proposed in the President's amended fiscal year 1990 budget request.

The recommendation includes advanced appropriations of \$600,000,000 each for the clean coal IV and V solicitations as well as phased funding to complete the \$575,000,000 Clean Coal III Demonstration Program as planned. In order to achieve the phase funding which is displayed in the table below the Committee has rescinded \$250,000,000 in funds appropriated by advance in fiscal year 1989 and reappropriated these funds by advance for fiscal

year 1991 and fiscal year 1992. The phased funding for clean coal III is similar in nature to the congressional approach in funding clean coal II.

The Committee expects no adverse effects from this approach since the recommended funding for clean coal III will permit the Department to select the same number of projects, and to complete the technology demonstrations within the same time period, as would a single appropriation totaling \$575,000,000 for this solicitation in fiscal year 1990.

A table outlining the previous appropriations for all clean coal solicitations as well as the Committee's recommendations for future years follows:

[In millions of dollars]							
	Fiscal year—						Total
	1986	1987	1988	1989	1990	1991	1992
Clean coal:							
I.....	99.4	149.1	149.1				
II.....			50.0	190	135	200	
III.....					575		
IV.....					-250	100	150
V.....						600	
Total.....	99.4	149.1	199.1	190	460	900	750
							2,747.6

The Committee urges the Department to review the Clean Coal Technology Program to ensure that in the future: (1) projects selected can make a long-lasting and cost-effective reduction in acid rain precursors; (2) projects selected can be commercially deployed by the year 2003; (3) technologies selected do not depend unnecessarily on nondomestic materials; and (4) a substantial number of the projects selected utilize energy efficient technologies which, by nature, reduce CO₂ emissions below the level that would be released by conventional technologies to produce the same energy level.

Previously, in clean coal I, the Committee permitted the Department to use up to 25 percent of solicitation funding for new, green-field type applications of technology. Subsequent solicitations were limited to technology demonstrations which could be conducted at a new site but which, by design, must be applicable to retrofitting or repowering existing powerplants or other major coal consuming facilities. This limitation was intended to focus the demonstration program on facilities which are not regulated under the new source performance standards of the Clean Air Act of 1970. The Committee has received testimony which indicates that some utilities may elect to discontinue certain older facilities in favor of constructing new, efficient, clean coal powered generating facilities which would employ technologies that, because of their large scale or their design, are not suited to repowering existing units. The Committee does not wish to inadvertently limit the suite of options which should be developed to meet the needs of the utility and coal-using industries. Consequently, the Department may, to the degree that

it believes appropriate, select during the IV and V clean coal solicitations technologies which are not retrofitable. However, the Department is cautioned to maintain the program's basic objectives of efficient power production and reduced emissions.

DEPARTMENT OF THE INTERIOR AND RELATED
AGENCIES APPROPRIATIONS BILL, 1990

JUNE 29, 1989.—Committed to the Committee of the Whole House on the State of
the Union and ordered to be printed

Mr. YATES, from the Committee on Appropriations,
submitted the following

REPORT

together with

ADDITIONAL VIEWS

[To accompany H.R. 2788]

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

The Committee recommends advance appropriations for two additional procurements of \$600,000,000 each for clean coal retrofit and repowering technology. The first procurement would be initiated in 1990 and the second would be initiated in 1991, as requested by the Administration. In view of the contemplated active consideration of clean air legislation by Congress, the Committee believes that such advance appropriations are necessary in order to assure that adequate support will be available for demonstrating advanced technologies should their use be assumed by the resulting legislation. Many of the technologies would be attractive in terms of efficiency or pollution reduction absent legislation. The Committee also recommends changing the availability of \$575,000,000 in funds made available for fiscal year 1990 in the fiscal year 1989 Appropriations Act for a third clean coal technology procurement. The recommendation would make \$500,000,000 available in fiscal year 1990, and make \$75,000,000 available in fiscal year 1991. This action, which is similar to that taken last year with regard to the second clean coal procurement, is taken solely because of budget authority limitations and, based on data provided by the Department, will have no effect on the pace of the program. That is the Committee's intent.

Response to the first two clean coal procurements indicates a high level of interest and support for the program by industry and its sponsors. Although few projects are operating at this point, most appear to be proceeding on reasonable schedules. For those projects which are experiencing difficulties the Committee urges a rapid resolution by the Department and project sponsors.

In addition to providing funding as described above, the Committee has included several provisions affecting the operation of the clean coal program. Bill language is included expressly providing for the use of funds excess to the needs of the procurement to which they originally were allocated for other procurements for which requests for proposals have not been issued. Language also is recommended prohibiting the use of backup, supplemental, or contingent project selections in procurements. The potential extended period of time projects could remain in such status and the fact that several similar procurements are expected to proceed makes such lists unnecessary, if not unwise. Projects not selected originally should compete on an unbiased basis with new projects in a subsequent procurement, rather than receiving possible preference if projects selected for negotiation fail to mature. Likewise, being on such a list could also discourage worthy projects from responding to subsequent requests for proposal. Finally, bill language is included allowing projects for which required reports to Congress are received near the end of a session of Congress to proceed 30 calendar days after receipt of the report by Congress, rather than after the usual 30 legislative day period. This provision is meant to avoid unnecessary delays in projects while still providing adequate time for Congressional review.

Current allocations for manpower in the clean coal account are for fifty-eight personnel. The Committee believes that additional personnel are necessary both in fiscal year 1989 and fiscal year 1990 based on the increasing number of active projects, and the plans for continued procurements. This additional workload would fall mainly on the Energy Technology Centers, and the Committee does not want additional manpower to be assigned from personnel currently assigned to and paid from the fossil energy research and development account. Although, the Committee is not recommending an employment floor in bill language, it expects the Department to provide adequate staffing, which is estimated to be eighty to eighty-five people by fiscal year 1990. Increased costs of personnel in fiscal year 1990 should be absorbed within the \$22,548,000 provided for operating expenses in the account. Technology transfer and program analysis contracts in headquarters should also be minimized.

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

For necessary expenses of, and associated with, Clean Coal Technology demonstrations pursuant to 42 U.S.C. 5901 et seq., \$575,000,000 shall be made available on October 1, 1989, and shall remain available until expended: *Provided*, That projects selected pursuant to a general request for proposals issued pursuant to this appropriation shall demonstrate technologies capable of retrofitting or repowering existing facilities and shall be subject to all provisos contained under this head in Public Laws 99-190 and 100-202 as amended by this Act.

The first paragraph under this head in Public Law 100-202 is amended by striking "and \$525,000,000 are appropriated for the fiscal year beginning October 1, 1988" and inserting "\$190,000,000 are appropriated for the fiscal year beginning October 1, 1988, and shall remain available until expended, \$135,000,000 are appropriated for the fiscal year beginning October 1, 1989, and shall remain available until expended, and \$200,000,000 are appropriated for the fiscal year beginning October 1, 1990": *Provided*, That outlays in fiscal year 1989 resulting from the use of funds appropriated under this head in Public Law 100-202, as amended by this Act, may not exceed \$15,500,000: *Provided further*, That these actions are taken pursuant to section 202(b)(1) of Public law 100-119 (2 U.S.C. 909).

101 Stat.
1329-240.

For the purposes of the sixth proviso under this head in Public Law 99-190, funds derived by the Tennessee Valley Authority from its power program are hereafter not to be precluded from qualifying as all or part of any cost-sharing requirement, except to the extent that such funds are provided by annual appropriations Acts: *Provided*, That unexpended balances of funds made available in the "Energy Security Reserve" account in the Treasury for The Clean Coal Technology Program by the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in section 101(d) of Public Law 99-190, shall be merged with this account: *Provided further*, That for the purposes of the sixth proviso in Public Law 99-190 under this heading, funds provided under section 306 of Public Law 93-32 shall be considered non-Federal: *Provided further*, That reports on projects selected by the Secretary of Energy pursuant to authority granted under the heading "Clean coal technology" in the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in Public Law 99-190, which are received by the Speaker of the House of Representatives and the President of the Senate prior to the end of the second session of the 100th Congress shall be deemed to have met the criteria in the third proviso of the fourth paragraph under the heading "Administrative provisions, Department Energy" in the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in Public Law 99-190, upon expiration of 90 calendar days from receipt of the report by the Speaker of the House of Representatives and the President of the Senate.

42 USC 5903d
note

Reports.

Joint Resolution

Making further continuing appropriations for the fiscal year 1988, and for other purposes.

Dec 22, 1987
[H.J. Res 395]

PUBLIC LAW 100-202—DEC. 22, 1987

101 STAT. 1329-240

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

For necessary expenses of, and associated with, Clean Coal Technology demonstrations pursuant to 42 U.S.C. 5901 et seq., \$50,000,000 are appropriated for the fiscal year beginning October 1, 1987, and shall remain available until expended, and \$525,000,000 are appropriated for the fiscal year beginning October 1, 1988, and shall remain available until expended.

No later than sixty days following enactment of this Act, the Secretary of Energy shall, pursuant to the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5901 et seq.), issue a general request for proposals for emerging clean coal technologies which are capable of retrofitting or repowering existing facilities, for which the Secretary of Energy upon review may provide financial assistance awards. Proposals under this section shall be submitted to the Department of Energy no later than ninety days after issuance of the general request for proposals required herein, and the Secretary of Energy shall make any project selections no later than one hundred and sixty days after receipt of proposals: *Provided*, That projects selected are subject to all provisos contained under this head in Public Law 99-190: *Provided further*, That pre-award costs incurred by project sponsors after selection and before signing an agreement are allowable to the extent that they are related to (1) the preparation of material requested by the Department of Energy and identified as required for the negotiation; or (2) the preparation and submission of environmental data requested by the Department of Energy to complete National Environmental Policy Act requirements for the projects: *Provided further*, That pre-award costs are to be reimbursed only upon signing of the project agreement and only in the same ratio as the cost-sharing for the total project: *Provided further*, That reports on projects selected by the Secretary of Energy pursuant to authority granted under the heading "Clean coal technology" in the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in Public Law 99-190, which are received by the Speaker of the House of Representatives and the President of the Senate prior to the end of the first session of the 100th Congress shall be deemed to have met the criteria in the third proviso of the fourth paragraph under the heading "Administrative provisions, Department of Energy" in the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in Public Law 99-190, upon expiration of 30 calendar days from receipt of the report by the Speaker of the House of Representatives and the President of the Senate.

42 USC 5903d
note.

Reports.

Public Law 99-190
99th Congress

Joint Resolution

Making further continuing appropriations for the fiscal year 1986, and for other purposes.

Dec. 19, 1985
[H.J. Res. 465]

PUBLIC LAW 99-190—DEC. 19, 1985

99 STAT. 1251

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

Within 60 days following enactment of this Act, the Secretary of Energy shall, pursuant to the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5901, et seq.), issue a general request for proposals for clean coal technology projects for which the Secretary of Energy upon review may provide financial assistance awards. Proposals for clean coal technology projects under this section shall be submitted to the Department of Energy within 60 days after issuance of the general request for proposals. The Secretary of Energy shall make any project selections no later than August 1, 1986: *Provided*, That the Secretary may vest fee title or other property interests acquired under cost-shared clean coal technology agreements in any entity, including the United States: *Provided further*, That the Secretary shall not finance more than 50 per centum of the total costs of a project as estimated by the Secretary as of the date of award of financial assistance: *Provided further*, That cost-sharing by project sponsors is required in each of the design, construction, and operating phases proposed to be included in a project: *Provided further*, That financial assistance for costs in excess of those estimated as of the date of award of original financial assistance may not be provided in excess of the proportion of costs borne by the Government in the original agreement and only up to 25 per centum of the original financial assistance: *Provided further*, That revenues or royalties from prospective operation of projects beyond the time considered in the award of financial assistance, or proceeds from prospective sale of the assets of the project, or revenues or royalties from replication of technology in future projects or plants are not cost-sharing for the purposes of this appropriation: *Provided further*, That other appropriated Federal funds are not cost-sharing for the purposes of this appropriation: *Provided further*, That existing facilities, equipment, and supplies, or previously expended research or development funds are not cost-sharing for the purposes of this appropriation, except as amortized, depreciated, or expensed in normal business practice.

42 USC 5903d

APPENDIX B

INTENTION TO PROPOSE FORM

APPENDIX B

INTENTION TO PROPOSE

PLEASE REVIEW THIS SOLICITATION. IN ORDER THAT WE CAN UPDATE OUR "SOURCE LIST," PLEASE COMPLETE THE ENTRIES BELOW, AND DETACH AND RETURN THIS PAGE BY THE EARLIEST PRACTICABLE DATE.

WE

 DO INTEND TO SUBMIT A PROPOSAL.

 DO NOT INTEND TO SUBMIT A PROPOSAL FOR THE FOLLOWING REASONS:

COMPANY NAME: _____

AUTHORIZED SIGNATURE: _____

TYPED OR PRINTED NAME AND TITLE: _____

DATE: _____

RETURN THIS PAGE TO:

DEPARTMENT OF ENERGY
OFFICE OF PLACEMENT AND ADMINISTRATION, OPERATIONS
BRANCH "A-1" (PR-321.1)
FORRESTAL BUILDING, ROOM 1J-005
1000 INDEPENDENCE AVENUE, S.W.
WASHINGTON, D.C. 20585

ATTN: HERBERT D. WATKINS

PROGRAM OPPORTUNITY NOTICE NO. DE-PS01-91FE62271

FORM DOE-PO-IP-578

APPENDIX C

PROPOSAL COVER SHEETS

Volume I: Qualification Proposal
Volume II: Demonstration Project Proposal
Volume III: Commercial Concept Proposal
Volume IV: Cost and Financing Proposal

Volume I - Qualification Proposal

U.S. Department of Energy
Program Opportunity Notice
Clean Coal Technology IV

for
DOE
use

PROPOSAL COVER SHEET

1. Copy Number:

2. Technology:

3. Project Title:

4. Proposer Name(s):

5. Proprietary Information: Does this submittal contain proprietary or business-confidential information?:

Check - yes

☐

no

☐

If your answer is YES, insert the "Notice re:Restrictions on Disclosure and Use of Data" (provided in the Program Opportunity Notice) in the space below:

NOTICE RE:RESTRICTIONS ON DISCLOSURE AND USE OF DATA

Volume II - Demonstration Project Proposal

U.S. Department of Energy
Program Opportunity Notice
Clean Coal Technology IV

for
DOE
use

PROPOSAL COVER SHEET

1. Copy Number:
2. Technology: _____
3. Project Title: _____

4. Proposer Name(s): _____

5. Proprietary Information: Does this submittal contain proprietary or business-confidential information?:
Check - yes ☐ no ☐

If your answer is YES, insert the "Notice re:Restrictions on Disclosure and Use of Data" (provided in the Program Opportunity Notice) in the space below:

NOTICE RE:RESTRICTIONS ON DISCLOSURE AND USE OF DATA

Volume III - Commercial Concept Proposal

U.S. Department of Energy
Program Opportunity Notice
Clean Coal Technology IV

for
DOE
use

PROPOSAL COVER SHEET

1. Copy Number:

2. Technology:

3. Project Title:

4. Proposer Name(s):

5. Proprietary Information: Does this submittal contain proprietary or business-confidential information?:

Check - yes

☐

no

☐

If your answer is YES, insert the "Notice re:Restrictions on Disclosure and Use of Data" (provided in the Program Opportunity Notice) in the space below:

NOTICE RE:RESTRICTIONS ON DISCLOSURE AND USE OF DATA

Volume IV - Cost and Financing Proposal

U.S. Department of Energy
Program Opportunity Notice
Clean Coal Technology IV

for
DOE
use

☐

PROPOSAL COVER SHEET

1. Copy Number: ☐
2. Technology: _____
3. Project Title: _____

4. Proposer Name(s): _____

5. Proprietary Information: Does this submittal contain proprietary or business-confidential information?:

Check - yes

☐

no

☐

If your answer is YES, insert the "Notice re:Restrictions on Disclosure and Use of Data" (provided in the Program Opportunity Notice) in the space below:

NOTICE RE:RESTRICTIONS ON DISCLOSURE AND USE OF DATA

APPENDIX D

QUALIFICATION CRITERIA CERTIFICATIONS

Qualification Criterion Certification

COST SHARE PERCENTAGES

I, the undersigned authorized representative for _____
(name of organization)
_____, for the proposal entitled _____
_____,
(proposal title)

now being submitted to the U.S. Department of Energy for financial assistance pursuant to Program Opportunity Notice DE-PS01-91FE62271, do hereby certify that the proposer's share of the costs involved in the proposed demonstration will be at least 50 percent of the total costs of the demonstration.

Furthermore, the proposer will cost share to the extent of at least 50 percent in each of the three phases: Phase I - "Design," Phase II - "Construction," and Phase III - "Operation."

Date

Name of Proposer

Signature of
Authorized Representative

Typed Name and Title of
Authorized Representative

Qualification Criterion Certification

PROJECTED REPAYMENT SCHEDULE

I, the undersigned authorized representative for _____
(name of organization)

_____, for the proposal entitled _____

_____,
(proposal title)

now being submitted to the U.S. Department of Energy for financial assistance pursuant to Program Opportunity Notice DE-PS01-91FE62271, do hereby certify that, if selected for negotiation of a cooperative agreement, a Projected Repayment Agreement will be prepared for the proposed project and submitted to the Department of Energy.

Date

Name of Proposer

Signature of
Authorized Representative

Typed Name and Title of
Authorized Representative

APPENDIX E

PUBLIC ABSTRACT FORM

Public Abstract

The Clean Coal Technology Program is one of the United States' largest energy initiatives. As such, it attracts considerable Congressional, media and public interest. To be responsive to these interests, the Department of Energy has prepared the following **Public Abstract** to be included as part of a proposer's submission.

The **Public Abstract** will be made available to the public shortly after the deadline for receipt of Clean Coal Technology proposals. It will be used to answer inquiries from and prepare information for members of Congress, the news media, state and local organizations and members of the public. It will *not* be used as part of the evaluation process.

Although not required for the purposes of proposal evaluation and/or selection, the **Public Abstract** does provide a way to fulfill the Department's responsibility to be responsive to public inquiries without compromising the proprietary or confidential aspects of a proposal. Each proposer, therefore, is encouraged to complete the following form as fully as possible.

Proposers are asked to photocopy the three-page form and fill in the requested information for inclusion with the proposal. If diagrams, flow sheets, or other material is necessary to explain the proposed Clean Coal Technology project, this material can be included as an attachment to the **Public Abstract** form.

Clean Coal Technology IV

Proposal #

Page #

(Proposer should leave blank)

Public Abstract

Proposer (primary) name: _____

Proposer address: _____

Street

City

State Zipcode

Team members (if any):

[Listing represents only participants at time of proposal, not necessarily final team membership]

Name

City

State Zipcode

Name

City

State Zipcode

Name

City

State Zipcode

(Use continuation sheet if needed)

Proposal title: _____

Project type:

(Check appropriate boxes)

☐

Retrofit

☐

Repowering

☐

Replacement

☐

Other, specify _____

Technology type: (Check only one in each box)

☐

Sulfur reduction only

☐

Nitrogen oxide reduction only

☐

Sulfur and nitrogen oxide reduction

☐

Other

Specify _____

☐

Precombustion cleaning

☐

Combustion or combustion modification

☐

Postcombustion gas cleanup

☐

Conversion (gasification, liquefaction, coprocessing, etc.)

☐

Other

Specify _____

Estimated total cost of project:

(May not represent final negotiated costs)

Total estimated cost: \$ _____

Estimated DOE share: _____

Estimated private share: _____

Can be expressed either as
estimated dollar figures or as
approximate percentages

Public Abstract (cont'd)

Proposal #

Page #

(Proposer should leave blank)

Anticipated project site(s):

Location (city, county, etc.) _____ State Zipcode

Location _____ State Zipcode

Location _____ State Zipcode

Type of coal to be used:

Primary _____ Alternate (if any) _____

Size or scale of project:

_____ Tons of coal/day input

and/or

_____ Megawatts,
Other (if necessary) Barrels per day, etc.

Duration of proposed project:

[From date of award]

_____ (Months)

**For additional information,
interested parties should contact:**

() _____
Telephone number

Name

Position

Company

Address

City State Zipcode

Public Abstract (cont'd)

Brief description of project:

[750 words or less. Use continuation sheet
if necessary]

Proposal #

Page #

(Proposer should leave blank)

APPENDIX F

PROJECT SUMMARY FORM

U.S. Department of Energy
Program Opportunity Notice
for
Clean Coal Technology III
Demonstration Projects

PROJECT SUMMARY FORM

1. Technology: _____
2. Project Title: _____

3. Proposer (Primary) Name: _____
Address: _____

Street: _____
City: _____ State: _____ Zip: _____
4. Principal Contact : _____
Title: _____
Telephone No: () ____ - ____
5. Site(s) Location: _____
(city, county, state)
6. Congressional District(s): _____

(Proposer)

(Project Site)

7. Applications: _____

8. Types of Coal to be Used: _____

9. Coal Source: _____

10. Project Size (Coal use rate or other measure of project size): ____ Ton/Hr
MWe
etc.

11. Proposed Duration of Each Project Phase (in months):

Preaward

&

Phase I

Phase II

Phase III

12. Proposed Project Total Duration (in months): _____

13-16. Estimated Total Project Costs (including both Proposer and Government):

Preaward

&

Total

Phase 1

Phase 2

Phase 3

Project

13. Proposed Cost: \$ _____ \$ _____ \$ _____ (14) \$ _____

15. Proposer Share: _____% _____% _____% (16) _____%

17. Project Team Members:

(a) Name or Corporate Identity: _____

Street: _____

City: _____ State: _____ Zip: _____

(b) Name or Corporate Identity: _____

Street: _____

City: _____ State: _____ Zip: _____

(c) Name or Corporate Identity: _____

Street: _____

City: _____ State: _____ Zip: _____

(Attach a page if needed to list additional members)

APPENDIX G

AUTHORIZATION

AUTHORIZATION CERTIFICATION

To the best of my knowledge and belief, data in this proposal consisting of this Volume I and Volumes II, III and IV are true and correct. In addition, I certify that I am authorized to submit this proposal on behalf of _____

_____ the proposing entity, and to commit the proposing entity _____ to comply with the assurances and certifications included in this proposal. The proposed funding for completing the Preaward and Statement of Work contained in this proposal is as follows:

Federal \$	_____	____%
Applicant \$	_____	____%
State \$	_____	____%
Local \$	_____	____%
Other \$	_____	____%
Total \$	_____	____%

(Name of the source(s) and amount of funds in each category)

Signature

Type Name of Proposing
Entity

Type Name and Title of Person
Signing This Certification

Date: _____

APPLICATION FOR FEDERAL ASSISTANCE

1. TYPE OF SUBMISSION: <i>Application</i> <input type="checkbox"/> Construction <input type="checkbox"/> Non-Construction		2. DATE SUBMITTED 		Applicant Identifier	
3. DATE RECEIVED BY STATE 		State Application Identifier			
4. DATE RECEIVED BY FEDERAL AGENCY 		Federal Identifier			
5. APPLICANT INFORMATION					
Legal Name:			Organizational Unit:		
Address (give city, county, state, and zip code):			Name and telephone number of the person to be contacted on matters involving this application (give area code):		
6. EMPLOYER IDENTIFICATION NUMBER (EIN): <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px 0;"></div>			7. TYPE OF APPLICANT: (enter appropriate letter in box) <input type="checkbox"/>		
8. TYPE OF APPLICATION: <input type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision If Revision, enter appropriate letter(s) in box(es): <input type="checkbox"/> <input type="checkbox"/> A Increase Award B Decrease Award C Increase Duration D Decrease Duration Other (specify): _____			A. State B. County C. Municipal D. Township E. Interstate F. Intermunicipal G. Special District		
			H. Independent School Dist. I. State Controlled Institution of Higher Learning J. Private University K. Indian Tribe L. Individual M. Profit Organization N. Other (Specify) _____		
9. NAME OF FEDERAL AGENCY: 					
10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px 0;"></div>			11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT: 		
12. AREAS AFFECTED BY PROJECT (cities, counties, states, etc.): 					
13. PROPOSED PROJECT:		14. CONGRESSIONAL DISTRICTS OF:			
Start Date	Ending Date	a Applicant		b Project	
15. ESTIMATED FUNDING:		16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?			
a. Federal	\$.00	a. YES. THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON DATE _____ b. NO <input type="checkbox"/> PROGRAM IS NOT COVERED BY E.O. 12372 <input type="checkbox"/> OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW			
b. Applicant	\$.00				
c. State	\$.00				
d. Local	\$.00				
e. Other	\$.00				
f. Program Income	\$.00	17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT? <input type="checkbox"/> Yes If "Yes," attach an explanation <input type="checkbox"/> No			
g. TOTAL	\$.00				
18. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT. THE DOCUMENT HAS BEEN ONLY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED					
a. Typed Name of Authorized Representative			b. Title		c. Telephone number
d. Signature of Authorized Representative					e. Date Signed

Previous Editions Not Usable

Standard Form 424 (REV 4-88)
Prescribed by OMB Circular A-102

Authorized for Local Reproduction

INSTRUCTIONS FOR THE SF 424

This is a standard form used by applicants as a required facesheet for preapplications and applications submitted for Federal assistance. It will be used by Federal agencies to obtain applicant certification that States which have established a review and comment procedure in response to Executive Order 12372 and have selected the program to be included in their process, have been given an opportunity to review the applicant's submission.

- | Item: | Entry: | Item: | Entry: |
|-------|--|-------|--|
| 1. | Self-explanatory. | 12. | List only the largest political entities affected (e.g., State, counties, cities). |
| 2. | Date application submitted to Federal agency (or State if applicable) & applicant's control number (if applicable). | 13. | Self-explanatory. |
| 3. | State use only (if applicable). | 14. | List the applicant's Congressional District and any District(s) affected by the program or project. |
| 4. | If this application is to continue or revise an existing award, enter present Federal identifier number. If for a new project, leave blank. | 15. | Amount requested or to be contributed during the first funding/budget period by each contributor. Value of in-kind contributions should be included on appropriate lines as applicable. If the action will result in a dollar change to an existing award, indicate <u>only</u> the amount of the change. For decreases, enclose the amounts in parentheses. If both basic and supplemental amounts are included, show breakdown on an attached sheet. For multiple program funding, use totals and show breakdown using same categories as item 15. |
| 5. | Legal name of applicant, name of primary organizational unit which will undertake the assistance activity, complete address of the applicant, and name and telephone number of the person to contact on matters related to this application. | 16. | Applicants should contact the State Single Point of Contact (SPOC) for Federal Executive Order 12372 to determine whether the application is subject to the State intergovernmental review process. |
| 6. | Enter Employer Identification Number (EIN) as assigned by the Internal Revenue Service. | 17. | This question applies to the applicant organization, not the person who signs as the authorized representative. Categories of debt include delinquent audit disallowances, loans and taxes. |
| 7. | Enter the appropriate letter in the space provided. | 18. | To be signed by the authorized representative of the applicant. A copy of the governing body's authorization for you to sign this application as official representative must be on file in the applicant's office. (Certain Federal agencies may require that this authorization be submitted as part of the application.) |
| 8. | Check appropriate box and enter appropriate letter(s) in the space(s) provided:
— "New" means a new assistance award.
— "Continuation" means an extension for an additional funding/budget period for a project with a projected completion date.
— "Revision" means any change in the Federal Government's financial obligation or contingent liability from an existing obligation. | | |
| 9. | Name of Federal agency from which assistance is being requested with this application. | | |
| 10. | Use the Catalog of Federal Domestic Assistance number and title of the program under which assistance is requested. | | |
| 11. | Enter a brief descriptive title of the project. If more than one program is involved, you should append an explanation on a separate sheet. If appropriate (e.g., construction or real property projects), attach a map showing project location. For preapplications, use a separate sheet to provide a summary description of this project. | | |

APPENDIX H

CERTIFICATIONS

ASSURANCES — NON-CONSTRUCTION PROGRAMS

Note: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant I certify that the applicant:

1. Has the legal authority to apply for Federal assistance, and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project costs) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States, and if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§ 4728-4763) relating to prescribed standards for merit systems for programs funded under one of the nineteen statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§ 1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§ 6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§ 523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. 290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. § 3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made, and (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply with the provisions of the Hatch Act (5 U.S.C. §§ 1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.
9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§ 276a to 276a-7), the Copeland Act (40 U.S.C. § 276c and 18 U.S.C. §§ 874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§ 327-333), regarding labor standards for federally assisted construction subagreements.

- (g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e), and (f).

Place of Performance: The applicant shall insert in the space provided below the site(s) for the performance of work done in connection with the specific grant: (street address, city, county, state, zip code)

An applicant who is an individual certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity with the grant.

This assurance is given in connection with any and all financial assistance from the Department of Energy after the date this form is signed. This includes payments after such date for financial assistance approved before such date. The applicant recognizes and agrees that any such assistance will be extended in reliance on the representations and agreements made in this assurance, and the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the applicant, its successors, transferees, and assignees, and on the authorized official (or individual applicant, as appropriate) whose signature appears below.

Organization Name

Award Number

Name and Title of Authorized Representative

Signature

Date

Certification Regarding
Debarment, Suspension, and Other Responsibility Matters
Primary Covered Transactions

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85. Section 85.510, Participants' responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160-19211).

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

- (1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
 - (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
 - (b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
 - (d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- (2) Where the prospective primary participants is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Instructions for Certification

1. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department of agency's

determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.

3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

4. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "Proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.

6. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

7. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion-Lower tier Covered Transactions," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transactions, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

10. Except for transactions authorized under paragraph 6 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

CERTIFICATION FOR CONTRACTS, GRANTS, LOANS, AND COOPERATIVE AGREEMENTS
(DEC 1989)

The undersigned certifies, to the best of his or her knowledge and belief , that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriate funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

STATEMENT FOR LOAN GUARANTEES AND LOAN INSURANCE (DEC 1989)

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard

Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Disclosure Form to Report Lobbying. (Form Attached)

CERTIFIED CORRECT BY:

Organization Name

PR/Award Number or Project Name

Name and Title of Authorized Representative

Signature

Date

**Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)**

1. Type of Federal Action: <input type="checkbox"/> a. contract <input type="checkbox"/> b. grant <input type="checkbox"/> c. cooperative agreement <input type="checkbox"/> d. loan <input type="checkbox"/> e. loan guarantee <input type="checkbox"/> f. loan insurance		2. Status of Federal Action: <input type="checkbox"/> a. bid/offer/application <input type="checkbox"/> b. initial award <input type="checkbox"/> c. post-award		3. Report Type: <input type="checkbox"/> a. initial filing <input type="checkbox"/> b. material change For Material Change Only: year _____ quarter _____ date of last report _____	
4. Name and Address of Reporting Entity: <input type="checkbox"/> Prime <input type="checkbox"/> Subawardee Tier _____, if known: Congressional District, if known: _____			5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime: Congressional District, if known: _____		
6. Federal Department/Agency:			7. Federal Program Name/Description: CFDA Number, if applicable: _____		
8. Federal Action Number, if known:			9. Award Amount, if known: \$ _____		
10. a. Name and Address of Lobbying Entity (if individual, last name, first name, MI):			b. Individuals Performing Services (including address if different from No. 10a) (last name, first name, MI):		
(attach Continuation Sheet(s) SF-LLL-A, if necessary)					
11. Amount of Payment (check all that apply): \$ _____ <input type="checkbox"/> actual <input type="checkbox"/> planned			13. Type of Payment (check all that apply): <input type="checkbox"/> a. retainer <input type="checkbox"/> b. one-time fee <input type="checkbox"/> c. commission <input type="checkbox"/> d. contingent fee <input type="checkbox"/> e. deferred <input type="checkbox"/> f. other, specify: _____		
12. Form of Payment (check all that apply): <input type="checkbox"/> a. cash <input type="checkbox"/> b. in-kind; specify: nature _____ value _____					
14. Brief Description of Services Performed or to be Performed and Date(s) of Service, including officer(s), employee(s), or Member(s) contacted, for Payment Indicated in Item 11:					
(attach Continuation Sheet(s) SF-LLL-A, if necessary)					
15. Continuation Sheet(s) SF-LLL-A attached: <input type="checkbox"/> Yes <input type="checkbox"/> No					
16. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the law above when the transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.			Signature: _____ Print Name: _____ Title: _____ Telephone No.: _____ Date: _____		
Federal Use Only:			Authorized for Local Reproduction Standard Form - LLL		

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLL-A Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a followup report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in item 4 checks "Subawardee", then enter the full name, address, city, state and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, state and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.
(b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.
14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee(s), or Member(s) of Congress that were contacted.
15. Check whether or not a SF-LLL-A Continuation Sheet(s) is attached.
16. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503

**DISCLOSURE OF LOBBYING ACTIVITIES
CONTINUATION SHEET**

Approved by OMB
0348-0046

Reporting Entity: _____ Page _____ of _____

APPENDIX I

DOE METHODOLOGY FOR EVALUATING THE COMMERCIAL POTENTIAL OF RETROFIT AND REPOWERING TECHNOLOGIES TO IMPROVE ENVIRONMENTAL PERFORMANCE AND THERMAL EFFICIENCY AT EXISTING FACILITIES AND/OR WHILE ADDRESSING FUTURE ENERGY NEEDS

NOTE: For the purposes of this methodology, replacement projects will be evaluated as either a retrofit or repowering technology, depending on the application.

DOE methodology for evaluating the commercial potential of retrofit and repowering technologies to improve environmental performance and thermal efficiency at existing facilities and/or while addressing future energy needs.

1.0 SUMMARY

Proposals will be separated into three categories: electric utility; industrial boilers and processes; and coal cleaning and upgrading technologies. DOE will evaluate proposals against several commercialization factors. This appendix describes the methodology that will be used to quantify the Commercialization Factors (a) Environmental Performance and (b) Thermal Efficiency (PON Section 4.4.1.2).

The Environmental Performance Commercialization Factor is evaluated on the basis of cost effective emission reductions for the proposed technology. Cost effective emission reductions are evaluated by a systems analysis for proposed technologies that are applicable to electric utilities. Proposed technologies that are not applicable to electric utilities are evaluated by unit analysis. The systems analysis uses available site-specific information for existing uncontrolled power generating boilers in the U.S. to assess the technical applicability of the proposed technology. DOE then employs a consistent methodology to assess incremental life cycle costs that will be potentially incurred by the electric utility industry upon deployment of the proposed technology where applicable to achieving a least cost emissions control scenario that meets requirements in the Clean Air Act. The principle atmospheric contaminants under consideration in the methodology are sulfur and nitrogen oxides. DOE will also determine the quantities of solid and liquid waste generated at existing units and for future energy needs to which the proposed technology is applicable. Minimal projected production of solid and liquid waste streams achieved by deployment of the proposed technology will be evaluated for the proposed technology.

The unit analysis will be used to evaluate industrial boilers and processes. Unlike the approach for systems analysis, the unit analysis requires information supplied by the proposer that identifies the conventional technology and the

environmental control system that, taken together, are competitive with the proposed technology. In this category, DOE will evaluate the Commercialization Factors by comparing the proposed technology to the conventional technology for a single application. Information supplied by the proposer that identifies market size and market share from present through the year 2030 will also be required by DOE to evaluate the Commercialization Factors.

The Thermal Efficiency Commercialization Factor is evaluated on the basis of a composite thermal efficiency for the proposed technology that is applicable to existing facilities as well as future energy needs. Applicability constraints are identical to those given in the evaluation of the Environmental Performance Commercialization Factor. The composite thermal efficiency is calculated on the basis of utilization of coal to form a useful product: a) from coal pile to bus bar for electric utility applications; and b) from coal pile to final product for industrial boilers and processes.

1.1 Electric Utility

Using information supplied by the proposer in Appendix I, and a database of existing power generation units, DOE will determine to which units the proposed technology is applicable and evaluate the environmental performance and thermal efficiency Commercialization Factors. Using projections of demand growth by power pool through the year 2030, and if the proposed technology will help satisfy this demand while meeting New Source Performance Standards (NSPS), DOE will then estimate the environmental performance and thermal efficiency for future energy needs. DOE will determine cost effective emission reductions from the incremental life cycle cost of electricity (COE), in constant dollars, for all existing units and for all future energy needs to which the proposed technology is applicable. Applicability constraints are based on site-specific technical requirements of the proposed technology as well as least cost power generation estimates pertaining to a power generating system comprised of conventional and proposed environmental controls that meet emission targets specified in the Clean Air Act. The power generating system COE will be evaluated over a protracted period of time (1995 through 2030).

For the purpose of the present evaluation, DOE can estimate in a consistent manner the cost of installing and operating a proposed retrofit or repowering technology on each of the existing boilers. Furthermore, DOE can make a consistent quantitative estimate of emissions, thermal efficiency and cost effectiveness that would result, boiler by boiler, with installation of the proposed technology. For all proposed technologies the data required by DOE to perform the analysis is obtained from the proposer via a set of worksheets contained in this Appendix I.

The Clean Air Act limits U.S. emissions of sulfur dioxide of the existing uncontrolled coal-fired boilers to approximately 10 million tons below 1980 emission levels, and will reduce in annual emissions of oxides of nitrogen by approximately 2.5 million tons by the year 2000. This estimate will serve as a basis for defining an emissions target to be achieved at minimal costs for the electric utility industry with optional deployment of conventional coal-based technologies and the proposed technology. Widespread applicability of a proposed technology defined here as billions of kW-hrs deployed by use of the proposed technology normalized to the power generating system emission allowance will be evaluated. In this manner, DOE will estimate the total market penetration expected by the proposed technology when deployed in applicable existing facilities, and when deployed for future energy needs through the year 2030. Cost effective high removal efficiency of oxides of nitrogen and sulfur for the proposed technology will also be considered as a potential contribution to the applicability of the deployment of the technology to achieve a fixed target emission allowance set forth in Clean Air Act.

In summary, the methodology used for the commercialization of the proposed technology employed at electric utilities will consider the following figures of merit: contribution of the proposed technology to achieve least cost energy production in existing power generating facilities and for future energy needs; contribution of the proposed technology to achieve widespread applicability with minimal production of solid/liquid wastes through minimization of the ratio of total emissions per unit of power generation and maximum cost effective power generation. The primary objective of the commercialization methodology is to

evaluate the impact of the proposed technology on a sustained least cost power generation system that is comprised of conventional and proposed coal-based technologies through the year 2030.

1.2 Coal Cleaning and Upgrading Technologies

For the purpose of this evaluation, coal cleaning and upgrading technologies (CCUT) will be treated in the same manner as a retrofit technology. CCUT plants primarily produce a refined coal that may be transported to one or more sites for combustion. Usually the coals produced have a lower sulfur content than the feed coal. Use of such coals represents an alternative path to retrofits applied at the boiler site for reducing SO₂ emissions from existing facilities. Sometimes it is necessary to modify facilities at the site of use to permit substitution of a new refined coal for the fuel previously employed.

Some CCUT technologies can be successfully applied to a wide range of U.S. coals. Other technologies are designed to treat only certain kinds of coals. Advanced coal cleaning technologies directed toward pyrite removal find most use in treating Eastern coals, which have relatively high pyrite contents. Thermal technologies directed toward increasing specific calorific content, destruction of pyrophoric properties, or improving structural stability of the feed coal are applied to low rank coals including lignite.

For any CCUT technology to play a significant role in reducing SO₂ emissions from existing facilities, its fuel product must have access to the greater part of the total market. Because of the regional distribution of low rank and high rank coals, and of coal consumption in the United States, the manner in which technologies that process the two ranks of coals address the market will differ. High rank coals and coal burning facilities for these coals are predominately concentrated east of the Mississippi River. Low rank coals are located predominately in the western United States. CCUT technologies directed toward high rank coals advantageously are able to treat coals having a wide range of sulfur contents extending upwards of 3 percent. Transportation costs for these coal products are less important in determining economic competitiveness than they

are for the products from low rank coals, due to the proximity of coal sources and markets. Low rank CCUT processors usually have the advantage of using a feedstock with a low sulfur content.

In view of these differences, DOE evaluates low rank and high rank CCUT technologies differently. As for clean coal technologies applied at the boiler site, evaluation proceeds by performing a comparison between the proposed technology and a conventional technology at each boiler site in the data base. The same conventional technology is applicable for both types of CCUT technologies. However, DOE distinguishes between the ways the two kinds of CCUT technologies will compete for market share.

CCUT technologies directed towards high rank coals will be evaluated by asking the proposer to describe cost and process performance of the proposed technology on a range of U.S. steam coals of varying sulfur content. The proposer must also provide data to allow DOE to calculate costs incurred, if any, for modifying existing facilities to use the coal produced.

In an analogous manner to that previously described, DOE uses the information supplied by the proposer to calculate environmental performance and thermal efficiency Commercialization Factors. In performing this calculation, DOE assumes that the feed coal to the CCUT plant that produces a cleaned/upgraded coal for a particular boiler is the same coal that is currently combusted in that boiler. Cost of transporting the cleaned coal to the boiler site is treated by using the cost of delivered coal in the analysis. Calculations for the conventional technology are made using the coals currently combusted in each boiler.

CCUT technologies directed to low rank coals are evaluated by requiring the proposer to identify the coal supply region and the location for one coal feedstock it considers to be most advantageous for use in its process. The proposer describes cost and process performance of the proposed technology with the selected coal. Data are given to calculate any costs incurred in modifying boilers for use of the upgraded coal. DOE estimates transportation costs for

the refined coal product from the region producing the selected coal to each of the boiler sites in the data base. DOE also calculates environmental credits, cost effectiveness, minimization of waste, removal efficiency for sulfur and nitrogen oxides, and thermal efficiency. Transportation of the processed coal to the boiler site is considered to be an operating cost.

1.3 Industrial Boilers and Processes

The industrial boilers and processes category includes all applications that are not expressly built to generate electricity or to clean coal prior to its final use. Examples of this category include: generation of process steam with/without electricity, coal liquefaction, or mild gasification to produce coal liquids and char. The products from these processes may or may not be upgraded, depending upon the intended markets. Multiple products may be generated from any of these processes.

For industrial boilers and processes, characteristics of the total market(s) are not known with the same detail as the power generation market for utilities. Since the targeted market(s) could vary widely depending upon the proposed technology, the proposer must identify the conventional application technology and the environmental control system that is competitive with (or would be replaced by) the proposed technology. In this category, DOE will compare the proposed technology to the conventional technology.

The evaluation factors (environmental performance and thermal efficiency) are calculated for both the proposed technology and the conventional technology identified by the proposer. However, unlike the electric utility category, DOE will perform the comparisons for a single application rather than for the total market(s).

The applicability comparison cannot be performed without additional information provided by the proposer. In a similar fashion described in section 1.1 of this Appendix, the proposer shall identify the market(s), and provide an estimate of

the total market(s) size and market(s) share for the proposed technology through the year 2030. DOE will accept, reject or modify the proposer's estimates for market penetration for the proposed technology through the year 2030.

2.0 ORGANIZATION OF WORKSHEETS

The DOE will evaluate the life cycle costs for mature versions of the technologies proposed under this PON as used for retrofit or repowering applications through the year 2030. DOE has developed worksheets to assist in completing this evaluation. The purpose of these worksheets is to obtain projections from the proposer for the technical, environmental and economic performance of mature, commercial versions of the proposed technology.

A basis for comparison is established by requiring that each proposer apply an extrapolated, mature version of its technology (or combined technologies) to a reference plant. For the purpose of this solicitation, "mature commercial version" is defined as a developmental status that reflects a well established technology which is being produced by several or many vendors in competition with each other. The associated cost and performance characteristics assume a fifth commercial plant that has taken full advantage of any capital cost learning curve involved in the technology's development. Conceptual design details of reference plants that are expected to be appropriate for many proposers are provided in Attachment A of this Appendix. The principal reference plant is a 300 MWe coal-fired utility facility. It is recognized that performance and cost parameters for clean coal technologies in retrofit or repowering applications are site specific because of the interfaces between the new equipment and the existing plant. However, the reference plant is defined in order to ensure a degree of uniformity. Application of the proposer's technology to the reference plant will result in a "base case" design. Computations of costs required to install the technology at different size plants and with use of various coals will be performed by DOE. The proposer is reminded that if a different reference plant is more appropriate for the proposed technology, it should be provided by the proposer and documented at a comparable level of detail to the power plant described in Attachment A.

As detailed more fully in the Attachment, Proposers of technologies installed at the boiler site are to describe use of their technology with a reference coal. Analysis of the reference coal is given in Table 2 of Attachment A.

Proposers of coal cleaning and upgrading technologies are required to develop two sets of data. One set describes the characteristics of the 750 tph CCUT plant, and the second describes the use of the cleaned/upgraded coal in the base case power plant.

Those Proposers whose technologies fall in the industrial boilers and processes categories (mild gasification, direct or indirect liquefaction, etc.) are required to use the Worksheet 7 series of worksheets to establish a "base case", and a proposed commercial technology application, for DOE to perform the single application comparison for evaluation of the Commercialization Factors. Proposers are reminded that estimates of market size and penetration through the year 2030 are also required to complete the evaluation of technologies that fall in the industrial boilers and processes category.

Blank copies of the worksheets to be filled in and submitted to DOE as part of the proposal are provided in this Appendix. Also included are instructions for completing the worksheets.

3.0 COAL CLEANING UPGRADING TECHNOLOGIES (CCUT)

3.1 Reference Coal Cleaning/Upgrading Plant Specifications

The unique feature of technologies that perform CCUT processing is the lack of need for the CCUT plant production scale to be consistent with that of the power plant. Indeed, economics usually dictate that one CCUT plant serve multiple power plants (and sometimes even other markets). As a consequence of the scale inconsistency, the commercialized version of a proposed remote CCUT plant is given to be a new, 750 tons per hour input, proposer defined plant. It is assumed that there is an adequate market for the entire output of the CCUT plant, even though only a portion of its output is utilized by the base case power plant. The power plant may buy as much fuel as it needs (up to the total output

of the CCUT plant) at the CCUT product fuel cost. Consequently, DOE requests that the proposer define a configuration and develop cost and performance data for a 750 tph CCUT plant (i.e., not a modification of an existing plant).

The total facility to be defined by the proposer should produce a cleaned/upgraded coal suitable for combustion in the reference power plant boiler without further treatment. Land requirements should be estimated for the CCUT plant and the cost of land should be included with the capital costs for the facility. Proposers whose product coal cannot be directly fired in the reference power plant must consider the additional costs that will be incurred in converting the power plant to use their cleaned/upgraded coal fuel. An example of such a fuel form would be coal-water slurries. Power plant modifications could include 60 day storage facilities, necessary transfer equipment and modifications to the boiler. These costs are to be computed only as applicable to the reference 300 MWe power plant.

3.2 Coals Used as Feedstock to Coal Cleaning/Upgrading Facilities

The manners in which CCUT technologies for treating high rank and low rank coals will be evaluated have been described in Section 1. Technologies for cleaning/upgrading high rank coals are to use the reference coal described in Table 2 of Attachment A as the feedstock for the 750 tph plant. Proposers of technologies to clean/upgrade low rank coals must specify a coal for use as feedstock. This is done in Worksheet 1B.

3.3 Coal Washability Data

Chemical analysis of the reference coal as a function of coal size is provided in Table 7, and detailed washability data are provided in Tables 8, 9, and 9A of Attachment A. Proposers of high rank coal CCUT technologies that have use for this type of data should use these Tables. Proposers of low rank coal CCUT technologies that have need of this type of data must provide similar information for their selected coal. This information, together with identification of its origin, must be provided as part of the submission for Worksheet 3.

4.0 TECHNOLOGY CLASSIFICATION

DOE recognizes that many different types of technologies and combinations of technologies can be applied to reduce the acid rain precursor emissions from existing facilities. In order to facilitate the evaluation process, DOE distinguishes between retrofit and repowering technologies which may be used to upgrade existing facilities or for replacement programs or greenfield applications. The replacement program emphasizes site-specific technology options that form a significant cost reduction potential for a large replacement market. This is inferred from the age profile of existing power generation capacity in the U.S. for coal-fired power plants. For example, twenty-eight percent of the 1988 generated capacity will be 35 to 40 years old in the year 2000.

4.1 Retrofit Technologies

Retrofit technologies are those which reduce emissions of sulfur dioxide and/or oxides of nitrogen by modifying existing facilities or their present feedstocks or by utilizing new fuel forms. Figure 1 provides examples of retrofit technologies.

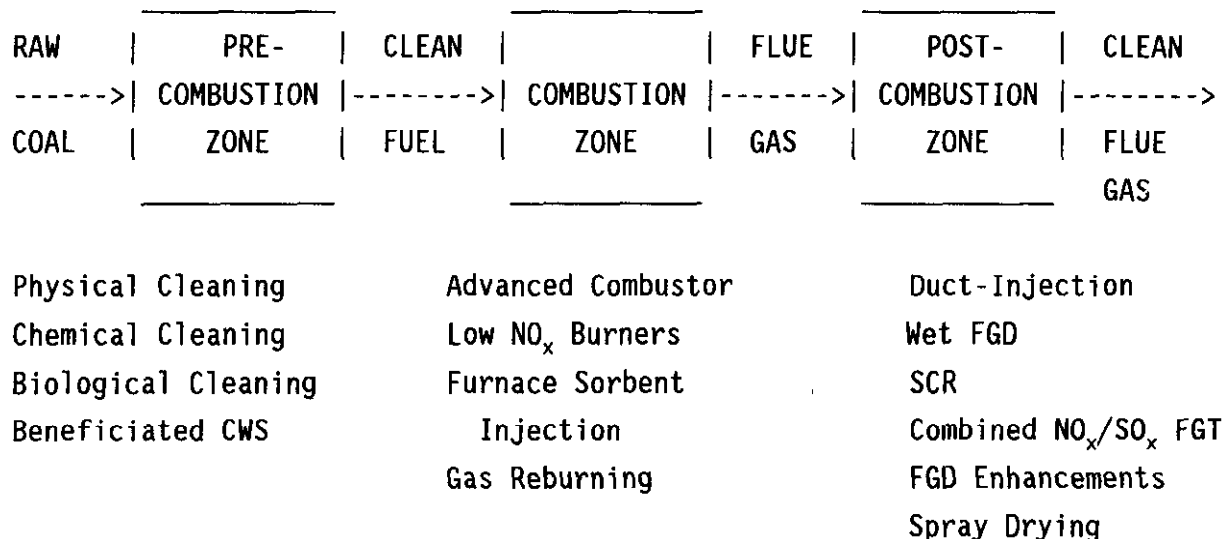


FIGURE 1. Definition of Retrofit Technology Categories

Retrofitting requires no specific levels of SO₂ and NO_x control for a technology (or system of technologies), but presumes that the level of reduction will typically equal or exceed 50 percent. The proposer should develop a design which is believed to represent the technology's most cost-effective or competitive emission control level. Proposers are reminded that technologies that do not meet New Source Performance Standards for sulfur dioxide and oxides of nitrogen emission control will not be widely applicable and deployed in the 2000 - 2030 time period for future energy needs.

4.2 Repowering Technologies

Repowering generally involves replacing an existing plant's aging boiler with new, fluidized-bed combustion, gasification, or other technology. A repowered coal-fired plant would retain much of its steam cycle and virtually all of its electrical generating and power conditioning hardware. However, these components would be refurbished simultaneously with the repowering and result in increased plant life. Repowering technologies include atmospheric fluidized-bed combustion (AFBC), pressurized fluidized-bed combustion (PFBC), integrated gasification combined-cycle (IGCC), and other repowering configurations. Repowering improves emission control and can improve plant operability. Repowering configurations involving combined gas and steam turbine systems typically also increase the plant's electrical generation capacity and efficiency.

5.0 INSTRUCTIONS FOR COMPLETING WORKSHEETS

Worksheets are provided by DOE to obtain descriptive information and cost data from the proposers for their technologies. This section provides the guidance and instructions for completing the blank worksheets.

The number and kind of worksheets that each proposer must complete depends on the type of clean coal technology being proposed. In this regard, all proposals are considered to fall in one of the categories listed below:

- o On-site Retrofit/Repowering

Refers to retrofit, repowering, and/or replacement technologies applied to the reference power plant.

- o Cleaning/Upgrading of High-rank Coal

Refers to processing high-rank coal remote from the reference power plant site.

- o Cleaning/Upgrading of Low-rank Coal

Refers to processing low-rank coal remote from the reference power plant site.

- o Coal Cleaning/Upgrading with On-site Retrofit/Repowering

Refers to a combination of technologies applied both remote from, and on the reference power plant site. Technologies applied at each sites must result in reductions of SO₂ and/or NO_x emissions, for example, coal cleaning with duct injection of sorbent.

o Industrial Boilers and Processes

Refers to mild gasification, direct and indirect liquefaction, coal gasification, other industrial processes and industrial boilers. The Worksheet 7 series of worksheets, is to be used for this category

Table 1 below lists all the worksheets contained in this Appendix except the Worksheet 7 series for the industrial category. It also indicates the number of each worksheet that a proposer must complete according to category of proposed technology. The number "1" entered in Table 1 means that a particular worksheet must be completed once, either for the reference power plant or for the 750 tph coal cleaning/upgrading plant. The number "2" entered in the Table means that the particular worksheet must be filled out twice, once for the plant on each site. A blank space indicates the worksheet is not required.

Proposers of repowering or retrofit technologies applied at the power plant site must complete a Worksheet 3 for each major plant section in which new equipment is installed. Proposers of coal cleaning/upgrading technologies must complete a Worksheet 3 for each major section of the new 750 tph plant.

Note that the parameters requested on the following worksheets are on different bases for repowering and for retrofit technologies. Values entered for repowered plants should be on the basis of a "whole plant" after the modification has been completed. Values entered for retrofitted plants should be "incremental values" associated with the installation of the retrofit technology unless specifically noted otherwise.

The Worksheet 7 series of worksheets should also be completed twice, once for the proposed technology and once for the baseline conventional technology the proposed technology is to be compared against.

On the following pages, blank worksheets are presented. Detailed instructions for completing the worksheets are found in Attachment A.

TABLE 1

WORKSHEET		REQUIREMENTS	BY TECHNOLOGY		CATEGORY
WORKSHEET		NUMBER/TITLE			
			ON-SITE	COAL	
			RETROFIT	PROCESSING	COAL PROCESSING
			OR	(HIGH-OR	WITH ON-SITE
			REPOWER	LOW-RANK)	RETROFIT/REPOWERING
1A	General Description of Retrofit and Repowering Technologies		1	1	1
1B	General Description of Coal Processing Plant		---	1	1
2	Block Flow Diagram		1	2	2
3	Description of Major Plant Sections		Variable	Variable	Variable: both plants
4A	Equipment Costs for Retrofit or Repowered Power Plant		1	0 or 1	1
4B	Costs for New 750 tph Remote Coal Processing Plant		---	1	1
5	Power Plant Economic Summary		1	---	1
5	Variable Operating Costs		1	0 or 1	1

WORKSHEET 1A
General Description of
Mature Version of Retrofit and Repowering Technologies

PROPOSER'S NAME: _____

TECHNOLOGY DESCRIPTION: _____

PLANT PERFORMANCE SUMMARY¹

	Reference Plant	After Clean Coal Technology
1. Coal or New Fuel Feed Rate , tph (Basis: As Received)	<u>117.6</u>	_____
2. Emissions, lb/MMBtu		
SO ₂	<u>3.8</u>	_____
NO _x as NO ₂	<u>1.2</u>	_____
Particulate Matter	<u>0.10</u>	_____
3. Rated Output Power Production, MWe		
Total Gross	<u>321.6</u>	_____
Total Net	<u>305.7</u>	_____
4. Net Heat Rate ² (Basis: HHV), Btu/kWh	<u>9,493</u>	_____

5. For Retrofit Technologies:

A. Indicate if Technology is in Pre-Combustion, Combustion, and/or
Post-Combustion Processing Zone: _____

B. Emission Control Specifications, % Reduction:

<u>Emission</u>	<u>Pre-Combustion</u>	<u>Combustion</u>	<u>Post-Combustion</u>	<u>Overall</u>
SO ₂	_____%	_____%	_____%	_____%
NO _x	_____%	_____%	_____%	_____%

¹ Full load design conditions.

² Plant boundary fuel input to busbar electricity.

TECHNOLOGY: _____
PROPOSER'S NAME: _____

WORKSHEET 1B
General Description of Coal Cleaning/Upgrading
(Applies Only to Processing of Coal at a Site Remote from the Power Plant)

TECHNOLOGY DESCRIPTION: _____

PLANT PERFORMANCE SUMMARY¹

	Input to CCUT Coal Plant	Output of CCUT Plant
1. Coal Feed or New Fuel Product		
Coal Feed and Product Rates, tph	750	
Fuel Higher Heating Value, Btu/lb		
Fuel Sulfur Content, wt %		
Fuel Sulfur Content, lb/MMBtu		
2. Feed and Product Characteristics (Proximate Analysis, wt %)		
Fixed Carbon		
Volatile Matter		
Ash		
Moisture		
3. % Yield (ton/ton feed, dry basis)		
4. % Btu Recovery Based on HHV		
5. Thermal efficiency of coal processing, %		
6. Sulfur-containing gases emitted during processing, lb S/10 ⁶ Btu of product		
7. Plant Annual Availability ² Factor, %		
8. Plant Construction Time, Days		
9. Total Annual Output, Tons (dry basis)		
10. Product a Slurry? (Y/N)		
Wt % of Solids if a Slurry		
11. (Identification and Description of Feedstock Coal)		

¹ All coal compositions on an as-received basis, except as noted.

² Fraction of year (8760 hours) the plant is "available" to process coal at some useful rate (excludes planned or unplanned shutdowns).

TECHNOLOGY: _____
PROPOSER'S NAME: _____

WORKSHEET 2
Block Flow Diagram Showing Major Plant Sections
After Clean Coal Technology Modifications

TECHNOLOGY: _____
PROPOSER'S NAME: _____

WORKSHEET 3
Description of Major Plant Sections in
Block Flow Diagram on Worksheet 2

Section Name: _____

Process Description: _____

Key Design Criteria: _____

Process Sequence: _____

Existing Equipment Mods: _____

TECHNOLOGY: _____

PROPOSER'S NAME: _____

WORKSHEET 4A

TOTAL INSTALLED EQUIPMENT COST (DECEMBER, 1988 \$) FOR RETROFITTED OR REPOWERED POWER PLANT

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Plant Section	Plant Section Title	Unadjusted New Plant Installed Equipment Cost, MM\$	Process Contingency Factor	Adjusted New Plant Installed Equipment Cost, MM\$	Equipment Utilization Factor	Unadjusted Installed Equipment Cost, MM\$
100						
200						
300						
400						
500						
600						
700						
800						
900						
1000						
1100						
1200						
1300						
1400						
1500						
1600						

Totals, MM\$

Retrofit Difficulty Factor

Total Retrofit Installed Equipment Cost, MM\$

TECHNOLOGY: _____
PROPOSER'S NAME: _____

WORKSHEET 4B

TOTAL COSTS (DECEMBER, 1988 \$) FOR NEW, 750 TPH, REMOTE, COAL CLEANING PLANT

1. Capital Costs, MM \$

(1) Plant Section	(2) Plant Section Title	(3) Installed Equipment Costs	(4) Process Contingency Factor	(5) = (3 X 4) Capital Costs
100	Raw Material Feed and Handling System (Excludes Fuel)	_____	_____	_____
200	Fuel Preparation and Storage System	_____	_____	_____
210	Coal Receiving and Storage	_____	_____	_____
220	Dense Media Recovery and Ash Conveyor	_____	_____	_____
230	Coal Screening	_____	_____	_____
240	Coarse Coal Separation	_____	_____	_____
250	Fine Coal Separation	_____	_____	_____
260	Intermediate Coal Separation	_____	_____	_____
270	Dewatering and Drying	_____	_____	_____
280	Clean Coal Storage and Handling	_____	_____	_____
1500	Common Support Systems	_____	_____	_____
1600	Other Equipment	_____	_____	_____
1700	Land	_____	_____	_____
1800	Other "Proposer Defined" Sections	_____	_____	_____

2. Total Capital Costs, MM \$ _____

3. Project Contingency Allowance, MM \$ _____

4. Engineering, Home Office, General Facilities and Royalties, MM \$ _____

5. Interest During Construction _____

6. Working Capital, MM \$ _____

7. Total Plant Investment, MM \$ _____

8. Total Annual Maintenance Cost, MM \$ _____

9. Total Annual Fixed O&M Cost, MM \$ _____

10. Total Variable Cost (Including Profit), \$/HR _____

11. Transportation costs of fuel produced at
low-rank coal processing plant, \$/ton of coal transported _____

TECHNOLOGY: _____
PROPOSER'S NAME: _____

WORKSHEET 5
POWER PLANT ECONOMIC SUMMARY (DECEMBER, 1988 \$)

<u>Capital Item</u>	<u>Capital Requirement (MM\$)</u>
(A) Process Area Capital (Worksheet 4A)	_____
(B) Total Plant Cost	_____
(C) AFDC, Construction Interest and Price Escalation Enter construction period _____ years	_____
(D) Total Plant Investment	_____
(E) Royalty Allowance	_____
(F) Preproduction Cost	_____
(G) Inventory Capital	_____
(H) Initial Catalyst and Chemicals	_____
(I) Total Capital Cost	_____

<u>Fixed Operating and Maintenance Item</u>	<u>O&M Requirement (MM\$)</u>
(J) Annual Maintenance Cost, MM\$	_____
(K) Annual Operating Labor Cost, MM\$ Enter number of operators/shift: _____	_____
(L) Annual Fixed O&M Cost, MM\$	_____

TECHNOLOGY: _____

PROPOSER'S NAME: _____

WORKSHEET 6
Variable Operating Cost
for Power Plant at Design Conditions

<u>Commodities</u>	(1) <u>\$/Unit*</u>	(2) <u>Quantity/Hr</u>	(3) <u>Commodity Cost \$/Hr</u>
1. Fuels ^{***} (e.g., Coal, Natural Gas)			
A.** _____	_____	_____	_____
B. _____	_____	_____	_____
C. _____	_____	_____	_____
2. Sorbents/Chemicals (e.g., Limestone)			
A. _____	_____	_____	_____
B. _____	_____	_____	_____
C. _____	_____	_____	_____
3. Raw Water	_____	_____	_____
4. Cooling Tower Blowdown Water	_____	_____	_____
5. Steam			
A. Low Pressure (<70 psia)	_____	_____	_____
B. Medium Pressure (70 - 250 psia)	_____	_____	_____
C. High Pressure (>250 psia)	_____	_____	_____
6. Parasitic Power	_____	_____	_____
7. Waste Effluents			
A. Dry, Granular Solids	_____	_____	_____
B. Sludge	_____	_____	_____
C. Contaminated Liquids	_____	_____	_____
D. _____	_____	_____	_____
8. By-Product Credits			
A. _____	_____	_____	_____
B. _____	_____	_____	_____
C. _____	_____	_____	_____
9. Fuel Credit			
A. _____	_____	_____	_____
10. Total Variable Operating Cost, \$/Hr			_____
11. Chemical Analysis of Sorbent			
Sorbent A (above)	Sorbent B (above)	Sorbent C (above)	
Constituent Wt %	Constituent Wt %	Constituent Wt %	
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

* From Table 10, or the proposer's values (with explanation and justification).

** If fuel comes from a coal cleaning/upgrading plant, enter only a value in column (2), tons/hr, and DOE will calculate the associated costs.

*** Incremental fuel requirements

TECHNOLOGY: _____
PROPOSER'S NAME: _____

WORKSHEET 7A
General Description of Industrial Boilers & Processes

TECHNOLOGY DESCRIPTION: _____

PLANT PERFORMANCE SUMMARY¹

	<u>Input to Industrial Plant</u>	<u>Output of Plant</u>
1. Coal Feed or Product		
Coal Feed and Primary Product Rates, tph	_____	_____
Primary Product Higher Heating Value, Btu/lb	_____	_____
_____ Product HHV, Btu/lb	_____	_____
_____ Product HHV, Btu/lb	_____	_____
2A. Feed Coal Characteristics (Proximate Analysis, wt %)		
Fixed Carbon	_____	
Volatile Matter	_____	
Ash	_____	
Moisture	_____	
2B. Product Characteristics		
_____ Product Sulfur, wt %		
_____ Product Sulfur, wt %		
_____ Product Nitrogen, wt %		
_____ Product Nitrogen, wt %		
3. % Yield (ton/ton feed, dry basis)		
_____ Product		_____
_____ Product		_____
_____ Product		_____
4. % Btu Recovery Based on HHV		

5. Thermal efficiency of plant, %		

6. Sulfur-containing gases emitted during processing, lb Sulfur/MM Btu of product		

7. Plant Annual Availability ² Factor, %		

8. Plant Construction Time, Days		

9. Identification and Description of Feedstock Coal		

¹ All coal compositions on an as-received basis, except as noted.

² Fraction of year (8760 hours) the plant is "available" to process coal at some useful rate (excludes planned or unplanned shutdowns).

TECHNOLOGY: _____
PROPOSER'S NAME: _____

WORKSHEET 7B
Block Flow Diagram Showing Major Plant Sections
After Clean Coal Technology

TECHNOLOGY: _____
PROPOSER'S NAME: _____

WORKSHEET 7C
Description of Major Plant Sections in
Block Flow Diagram on Worksheet 7B

Section Name: _____

Process Description: _____

Key Design Criteria: _____

Process Sequence: _____

Existing Equipment Mods (if applicable): _____

TECHNOLOGY: _____
PROPOSER'S NAME: _____

WORKSHEET 7D
TOTAL INSTALLED EQUIPMENT AND OPERATING COSTS FOR INDUSTRIAL PLANT

1. Capital Costs, MM \$

Plant Section	Plant Section Title	Unadjusted New Plant Installed Equipment Cost, MM\$	Process Contingency Factor	Adjusted New Plant Installed Equipment Cost, MM\$
100	_____	_____	_____	_____
200	_____	_____	_____	_____
300	_____	_____	_____	_____
400	_____	_____	_____	_____
500	_____	_____	_____	_____
600	_____	_____	_____	_____
700	_____	_____	_____	_____
800	_____	_____	_____	_____
900	_____	_____	_____	_____
1000	_____	_____	_____	_____
1100	_____	_____	_____	_____
1200	_____	_____	_____	_____
1300	_____	_____	_____	_____
1400	_____	_____	_____	_____
1500	_____	_____	_____	_____
1600	_____	_____	_____	_____

2. Total Capital Costs, MM \$ _____
3. Project Contingency Allowance, MM \$ _____
4. Engineering, Home Office, General Facilities and Royalties, MM \$ _____
5. Interest During Construction _____
6. Working Capital, MM \$ _____
7. Total Plant Investment, MM \$ _____
8. Total Annual Maintenance Cost, MM \$ _____
9. Total Annual Fixed O&M Cost, MM \$ _____
10. Total Variable Cost (Including Profit), \$/HR _____

TECHNOLOGY: _____
PROPOSER'S NAME: _____

WORKSHEET 7E
INDUSTRIAL PLANT ECONOMIC SUMMARY

<u>Capital Item</u>	<u>Capital Requirement (MM\$)</u>
(A) Process Area Capital (Worksheet 8D)	_____
(B) Total Plant Cost	_____
(C) AFDC, Construction Interest and Price Escalation Enter construction period _____ years	_____
(D) Total Plant Investment	_____
(E) Royalty Allowance	_____
(F) Preproduction Cost	_____
(G) Inventory Capital	_____
(H) Initial Catalyst and Chemicals	_____
(I) Total Capital Cost	_____

<u>Fixed Operating and Maintenance Item</u>	<u>O&M Requirement (MM\$)</u>
(J) Annual Maintenance Cost, MM\$	_____
(K) Annual Operating Labor Cost, MM\$ Enter number of operators/shift: _____	_____
(L) Annual Fixed O&M Cost, MM\$	_____

TECHNOLOGY: _____

PROPOSER'S NAME: _____

WORKSHEET 7F
Variable Operating Cost
for Industrial Plant at Design Conditions

<u>Commodities</u>	<u>\$/Unit</u>	<u>Quantity/Hr</u>	<u>Commodity Cost \$/Hr</u>
1. Fuels (e.g., Coal, Natural Gas)			
A. _____	_____	_____	_____
B. _____	_____	_____	_____
C. _____	_____	_____	_____
2. Sorbents/Chemicals (e.g., Limestone)			
A. _____	_____	_____	_____
B. _____	_____	_____	_____
C. _____	_____	_____	_____
3. Raw Water	_____	_____	_____
4. Cooling Tower Blowdown Water	_____	_____	_____
5. Steam			
A. Low Pressure (<70 psia)	_____	_____	_____
B. Medium Pressure (70 - 250 psia)	_____	_____	_____
C. High Pressure (>250 psia)	_____	_____	_____
6. Consumed Power	_____	_____	_____
7. Waste Effluents			
A. Dry, Granular Solids	_____	_____	_____
B. Sludge	_____	_____	_____
C. Contaminated Liquids	_____	_____	_____
D. _____	_____	_____	_____
8. By-Product Credits			
A. _____	_____	_____	_____
B. _____	_____	_____	_____
C. _____	_____	_____	_____
9. Fuel Credit			
A. _____	_____	_____	_____
10. Total Variable Operating Cost, \$/Hr			_____

Worksheet 1: General Description of Clean Coal Project

Worksheet 1A requests a general description of a mature commercial version of the proposed retrofit or repowering technology as applied to the reference power plant. The requested data are for the whole plant after modification (i.e., incremental values are not to be provided for a retrofit technology). All proposers must complete Worksheet 1A. For proposers of coal cleaning/upgrading technologies, items 1-5 are to describe operation of the reference power plant using the CCUT derived fuel. In item 5B, the percent reductions requested for each processing zone are based on the uncontrolled emissions of the unmodified reference plant.

Worksheet 1B requests similar information for a coal cleaning/upgrading plant and is applicable only if the proposed technology involves the pre-combustion treatment of coal at a site remote from the power plant. See the items to be completed in the column labeled "Input to CCUT Coal Plant. The requested values are for the reference coal and can be found in Table 2 (Attachment A) for proposers of high-rank coal cleaning/upgrading technology. For proposers of low-rank coal cleaning/upgrading, the requested values are for the coal specified by the proposer.

For coal cleaning/upgrading technologies that release one or more sulfur-containing gases to the atmosphere during processing, the amount of emitted sulfur per million BTU of fuel product(s) must be recorded on Worksheet 1B.

Proposers of low-rank coal cleaning/upgrading must attach an addendum to Worksheet 1B. In the addendum the coal to be used as a process feedstock must be specified. The specification must include the coal seam, its location, and salient characteristics of the coal. Characterization of the coal should follow the form of Table 2 in the Attachment. Evidence must also be presented that commercially significant reserves of the specified coal are available for use.

Worksheet 2: Block Flow Diagram (Showing Major Plant Sections)

On Worksheet 2, block flow diagrams describing the major plant sections in which new equipment is installed in the "as modified" power plant and/or the major plant sections of the new coal cleaning/upgrading plant, as applicable, are to be provided. At a minimum, the flow diagrams should describe the interconnections of the major sections in the plant, flow rates and compositions of major feed and effluent streams from the

plant (complete accounting of solid and liquid waste streams), as well as temperatures and pressures of major streams between blocks. A set of plant section definitions for the block flow diagrams should be selected, as applicable, from Tables 2 through 5. Within a table of section definitions, only those sections relevant to the proposed technology are to be utilized. Table 2 applies to retrofit technologies and off-site processing of coal. In the event a technology applicable to a remote site coal cleaning/upgrading plant is proposed, two versions of Worksheet 2 are to be completed (i.e., one for the coal cleaning/upgrading plant and one to reflect any effects on, or modifications to, the power plant). Tables 3, 4, and 5 apply to, respectively, PFBC repowering, AFBC repowering, and IGCC repowering. If a repowering technology not addressed in Tables 3, 4, or 5 is proposed, the proposer shall complete Worksheet 2 for the proposed technology, providing information at a level of detail similar to that listed in Tables 3 through 5.

TABLE 2

List of Major Sections in Retrofitted and/or Coal Cleaning Plant

Section	Definition
100	Non-Coal Feed and Handling
200	Coal Preparation and Storage
210	Coal Receiving and Storage (coal preparation only)
220	Dense Media Recovery and Ash Conveyor (coal preparation only)
230	Coal Screening (coal preparation only)
240	Coarse Coal Separation (coal preparation only)
250	Fine Coal Separation (coal preparation only)
260	Intermediate Coal Separation (coal preparation only)
270	Dewatering and Drying (coal preparation only)
280	Clean Coal Storage and Handling (coal preparation only)
300	Fuel and Oxidant Feed and Handling
400	Combustion/Steam Generation
500	Fuel Gas Processing and Handling
600	Power Generation
700	SO ₂ Removal Unit
800	NO _x Removal Unit
900	Particulate Removal
1000	Flue Gas Ducting and Fans
1100	Sorbent Regeneration
1200	By-Product Processing and Handling
1300	Chimney or Stack
1400	Waste Handling
1500	Balance of Plant

TABLE 3

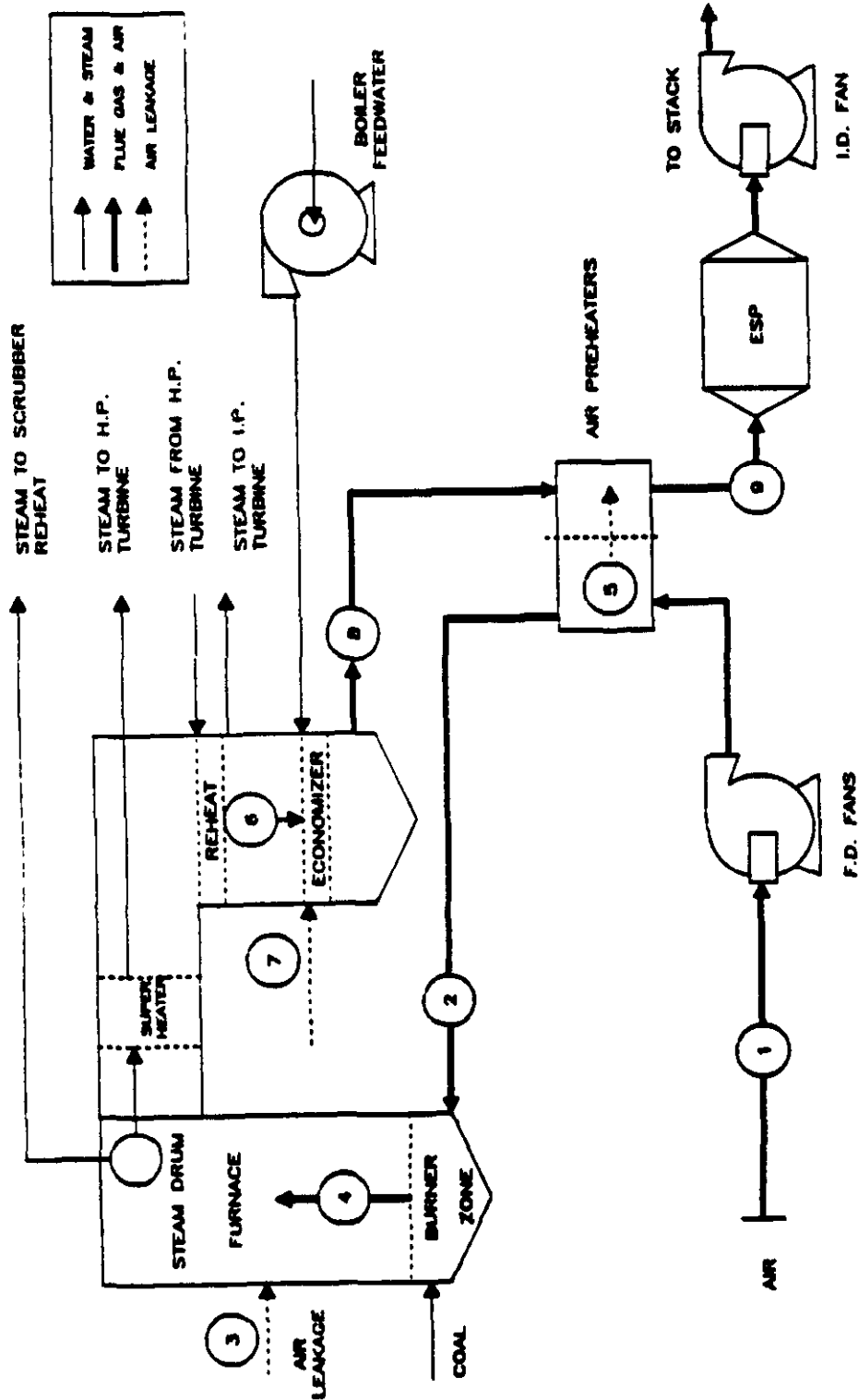
List of Major Plant Sections in PFBC Repowering

Section	Definition
100	Solids Receiving, Drying, Grinding, and Slurrying
200	PFBC Steam Generator
300	High-Temperature Particulate Removal
400	Gas Turbine(s)/Generator
500	Steam Turbine(s)/Generator
600	Electrical Power Plant (switchgear, transformers, controls, distribution panels)
700	Post Gas Turbine Heat Recovery
800	Post Gas Turbine Particulate Removal
900	Solid Waste Handling
1000	Balance of Plant (control and office buildings, machine shop, warehouse and garages, auxiliary boilers and diesel building, waste treatment structures, stack, hot gas piping, interconnecting duct work, fans, supports, foundations, fuel oil system, plant air system, fire protection, general plant equipment)

TABLE 4

List of Major Plant Sections in AFBC Repowering

Section	Definition
100	Solids Receiving, Drying, Grinding, and Slurrying
200	AFBC Steam Generator
300	Steam Turbine(s)/Generator
400	Electrical Power Plant (switchgear, transformers, controls, distribution panels)
500	Particulate Removal
600	Solid Waste Handling
700	Balance of Plant (control and office buildings, machine shop, warehouse and garages, auxiliary boilers and diesel building, waste treatment structures, stack, hot gas piping, interconnecting duct work, fans, supports, foundations, fuel oil system, plant air system, fire protection, general plant equipment)



STREAM NO.	1	2	3	4	5	6	7	8	9
TEMP., °F	80	550	80	1800	80	1050	80	725	304
PRESSURE, in. WG	0.0	+0.6	0.0	-0.1	0.0	-5.0	0.0	-8.5	-11.5
MSCFM	599	550	11	585	49	597	9	606	655
MACFM	622	1069	12	2545	50	1733	10	1381	962
% OXYGEN, by volume	21	21	21	2.7	21	3.1	21	3.2	4.5
% EXCESS AIR	26	16	--	16	--	19	--	20	30
SOLIDS, klb/hr	--	--	--	30.8	--	30.8	--	27.8	27.8

Standard Conditions

60 °F, 14.69 PSIA

Ambient Conditions

14.4 PSIA
60% R.H.
(0.013 lb H₂O/lb Dry Air)

F.D. FANS

TO STACK

I.D. FAN

AIR PREHEATERS

BOILER
FEEDWATER

STEAM TO SCRUBBER
REHEAT

STEAM TO H.P.
TURBINE

STEAM FROM H.P.
TURBINE

STEAM TO I.P.
TURBINE

3
AIR
LEAKAGE

COAL

Figure 5. Schematic Flow Sheet of Nominal 300 MW Reference Plant

TABLE 5

List of Major Plant Sections in IGCC Repowering

Section	Definition
100	Solids Receiving, Drying, Grinding, and Slurrying
200	Oxygen Plant/Air Compressor
300	Coal Gasification Including Pressurized Fuel System and Ash Removal
400	Gas Stream Heat Recovery
500	Gas Stream Particulate Removal
600	Gas Stream Desulfurization
700	Gas Turbine(s)/Generator
800	Steam Turbine(s)/Generator
900	Booster Compressor
1000	Wastewater Treatment
1100	Solid Waste Handling
1200	Balance of Plant (switchgear, transformers, controls, distribution panels, control and office buildings, machine shop, warehouse and garages, auxiliary boilers and diesel building, waste treatment structures, stack, hot gas piping, interconnecting duct work, fans, supports, foundations, fuel oil system, plant air system, fire protection, general plant mechanical and electrical equipment).

Worksheet 3: Description of Major Plant Sections in Block Flow Diagrams on Worksheet 2

On Worksheet 3, information is to be provided for each of the plant sections shown on Worksheet 2 which would be modified or added to the plant as part of the proposed clean coal technology. A separate copy of Worksheet 3 is to be used for each section. Where applicable, the following information is to be provided: (a) section name; (b) process description documenting the process chemistry and reaction conditions associated with major unit operations (e.g., flue gas treatment or PFBC) or the key mechanical operation parameters (e.g., physical coal cleaning) within the section; (c) key process design criteria such as reagent/consumable stoichiometries, process residence time data, and replacement equipment size (e.g., replacement burner capacity); (d) description of process sequence; and (e) existing equipment modifications required to implement the clean coal technology. (If this information is included in the main text of the proposal, a cross-reference to the information can be provided.)

Worksheet 4A: Equipment Costs for Boiler Site Modifications

On Worksheet 4A, information on the costs for installing the clean coal technology equipment at the reference power plant is to be provided. The equipment costs developed on the worksheets exclude project contingencies, engineering and home office fees, allowance for funds used during construction (AFDC) and price escalation, startup and working capital, and initial catalyst and chemical costs. These costs are considered in Worksheet 5. Proposers of a coal cleaning/upgrading technology must complete a Worksheet 4A for any capital costs incurred at the reference power plant to convert to use of the processed fuel. Methodology and assumptions used in developing the costs can be provided by the proposer as an addendum to Worksheet 4, if desired. Directions for filling in each of the columns on Worksheet 4A to calculate capital costs are given immediately below. Worksheet 4A applies to retrofit and to repowering technologies.

Column 1 -- Plant section numbers should correspond to section numbers used in one of Tables 2 through 5, as applicable. Plant modification costs not included with any other plant section costs should be included as a separate line item.

Column 2 -- Plant section titles for Worksheet 4A should correspond to the titles used in one of Tables 2 through 5, as applicable.

Column 3 -- For retrofit technologies, the costs on Worksheet 4A shown in Column 3 should be for installation of the incremental equipment and any required modification or refurbishment of existing equipment in the reference power plant. Costs should be calculated as if the work was done in an entirely new, grass roots plant of the capacity shown in Worksheets 1A and 2. For repowering technologies, the costs on Worksheet 4A should be the total costs by section for building an entirely new plant of the capacity shown in Worksheets 1A and 2. (Note: the adjustments to the Column 3 values in Worksheet 4A to account for the use of existing equipment and retrofit difficulties in an existing plant are made using the factors provided in other columns as discussed below.) For each plant section, the costs given in Column 3 should include both direct field material and labor costs, as well as the civil engineering, structural, and architectural costs associated with the plant section. Since it is to be assumed this data is applicable to the Nth plant, any economies due to factors such as design standardization, modularization, etc. should be utilized in estimating these costs. Vendor price quotes, cost data from previous design studies of a similar size and scope, or existing literature data can be used to establish the installed cost of each plant section.

The cost reporting basis for the worksheets is December constant 1988 dollars (January 1989 costs expressed in constant December 1988 dollars). All costs should be adjusted using the appropriate process plant cost index factor obtained from Table 6 and the equation shown below.

$$\begin{array}{rclcl} \text{Cost data in} & = & \text{Cost data} & \times & \frac{342.5}{\text{Cost factor in other year}} \\ 1988 \text{ base-year} & & \text{in other year} & & \end{array}$$

TABLE 6
Process Plant Cost Index Factors

	<u>Annual Index</u>	<u>Cost Factor</u>	<u>Annual Index</u>	<u>Cost Factor</u>
1980	261.2			
1981	297.0			
1982	314.0			
1983	316.9			
1984	322.7			
1985	325.3			
1986	318.4			
1987	323.8			
1988	342.5			
1989	355.4			
1990				

Columnn 4 -- The development status of a technology affects the accuracy with which the cost of a commercial version of that technology can be estimated. In order to quantify uncertainty in the design and in project cost of commercial-scale equipment, a process contingency factor is applied to each major plant section. Table 7 provides guidelines for selecting process development contingency factors for each plant section based on the present level of development of the technology used within that section. Appropriate factors are to be listed in Column 4 of Worksheet 4A.

Column 5 -- Adjusted new plant installed equipment cost is entered in Column 5 by plant section. It is computed as the multiplicative product of unadjusted new plant installed equipment cost (Column 3) and process contingency factor (Column 4). Values in Column 5 should be summed and entered in the space provided.

TABLE 7
Technology Development Status

State of Technology	Process Contingency Factor*
New Concept with Limited Data	1.7
Bench-Scale Data Available	1.5
Small Pilot Plant Data Available	1.25
Full-Size Module Has Been Operated	1.15
Process is Used Commercially	1.00

* As a fraction of installed equipment cost.

Column 6 -- The equipment utilization factor is applicable only to repowering technologies. It is a capital cost multiplier which only reflects the fraction (on a cost basis) of the plant section's equipment needs which must be satisfied by new equipment. It will have values between 0.0 and 1.0. This factor is much less than 1.0 where a significant fraction of the existing equipment can be utilized. This factor would equal zero if all of the modified plant sections equipment needs were satisfied by existing, installed equipment (e.g., the steam turbine/generator section for an IGCC). Plant sections composed entirely of new equipment would have equipment utilization factors of 1.0.

TABLE 8

Retrofit Factors for a 300 MWe Plant

<u>Technology Class</u>	<u>Retrofit Factor</u>
Add-On	1.52
Cold Duct	1.72
Hot Duct	1.92
In-Situ	2.12
Other Pre-Combustion	1.52
PFBC	1.52
IGCC	1.42
AFBC	1.32

Column 7 -- On Worksheet 4A, installed equipment cost that is not yet adjusted for equipment utilization is entered by plant section in Column 7. It is the multiplicative product of adjusted new plant installed equipment cost (Column 5) and equipment utilization factor (Column 6). Values for all plant sections should be summed and entered in the space provided.

Retrofit Difficulty Factor -- On Worksheet 4A space is provided for entering the retrofit difficulty factor for the entire new installation. The retrofit factor is a capital cost multiplier which only reflects the complexity of construction and refurbishment activities in an existing plant. The magnitude of the retrofit factor depends on the "degree of difficulty" of the in-plant work and typically falls in the range of 1.0 to 2.5. Data on retrofit factors for utility construction have been

compiled and organized according to type of technology, original plant size (MW), and age of plant. Values appropriate to the age and sizes of the base case plants shown in Figures 1-4 of the Attachment are given in Table 8. Proposers should select the appropriate retrofit factor for the technology listed that is most like that being proposed and enter it in the space provided.

Total Retrofit Installed Equipment Cost -- This cost is computed as follows. For retrofit technologies using Worksheet 4A, the total adjusted new plant installed equipment cost (summation of entries in Column 5) is multiplied by the retrofit difficulty factor (RDF). For repowering technologies using Worksheet 4A, the total unadjusted installed equipment cost (summation of entries in Column 7) is multiplied by the RDF. In either case the product is entered in the space provided.

Worksheet 4B: Costs for a Remote Coal Cleaning/Upgrading Plant

Proposers of a coal cleaning/upgrading technology are to complete this Worksheet to describe costs of a greenfield, 750 ton per hour plant. Capital costs are to be entered by plant section in item 1.

Installed equipment costs are for greenfield installation. See the instructions for Worksheet 4A for a discussion of process contingency factor.

See the instructions for Worksheet 5 for completing items 3 - 10. Parts 3,4,5,7,8, and 9 are to be based on the proposer's judgment, and a narrative support for the entries is expected. Any by-product credits claimed should be included in part 10 with an explanation.

Proposers of high-rank coal cleaning/upgrading should not include coal feed as a variable cost. DOE will compute a processing cost for the proposed technology and add it to the cost of delivered coal at the power plant sites in its data base.

Proposers of low-rank coal cleaning/upgrading should include the minemouth F.O.B. cost of the coal used in their process as a variable cost. DOE will compute the transportation charge for the new upgraded coal produced at the coal cleaning/upgrading plant to each boiler site in its data base. Proposers of low-rank coal cleaning/upgrading technologies must also provide discussion and data on transportation

of their fuel product. The purpose is to help DOE compute transportation charges from the coal cleaning/upgrading plant, assumed to be located near the feed coal source, to utility power stations throughout the U.S. The mode of transportation should be stated. Anticipated shipping costs to several major cities located throughout the country should be given, or some alternative manner of furnishing similar data should be used. The basis of the shipping cost estimates should be given. If this information is presented elsewhere in the proposal, reference may be made to this information.

Worksheet 5: Financial Requirement Calculation

This Worksheet develops the incremental or total capital requirement respectively for retrofitted or repowered commercial power plants, using a technique which parallels an EPRI format¹. In addition, operating and maintenance requirements for the proposed facility are calculated.

Total (or incremental) capital cost, as computed by this Worksheet, includes the total installed equipment cost, general facilities, project contingency, engineering and home office fee, AFDC and price escalation, royalty allowance, preproduction costs, inventory capital, and initial catalyst and chemicals. Appropriate factors for allowance for funds for interest and price escalation during construction are provided in Table 9.

Process area capital cost, item A, is obtained from the final entry on worksheet 4A, total retrofit installed equipment cost. For retrofit technologies, if any additional costs are incurred as a result of work done in plant sections not listed on Worksheet 4A, a plant work scope adjustment charge should be included for the entry in item A.

¹ EPRI Technical Assessment Guidelines, EPRI P-6587-L, Volume 1 (Rev. 6), 1989.

TABLE 9
ALLOWANCE FOR FUNDS FOR INTEREST AND PRICE ESCALATION DURING CONSTRUCTION²

Construction Period (Years)	AF (Fraction of Total Plant Cost)
1	0
2	0.054
3	0.109
4	0.167
5	0.223
6	0.279

The Total Plant Cost, item B, consists of process area capital, general facilities, project contingency, and engineering and home office fees. The Total Plant Cost can be estimated from the following expression:

$$\text{Total Plant Cost} = 1.42 * (\text{Process Area Capital})$$

AFDC, item C, is computed by multiplying the appropriate factor from Table 9 times the Total Plant Cost.

The Total Plant Investment, item D, is the sum of the Total Plant Cost and AFDC.

Items E through H consider other costs associated with start-up of the modified power plant (royalty allowance, preproduction costs, inventory capital, and initial catalyst and chemicals). Royalty allowance is to be estimated as 0.5 % of the process area capital unless the proposed technology would not anticipate having any royalty charge for commercial applications. Preproduction costs reflect operator training, equipment checkout, plant repair and modifications during start-up, and inefficient use of fuel and other materials during plant start-up. This cost is estimated as the sum of the following items: one month fixed O&M cost; one month variable operating costs, VOC (consumables), excluding fuel and by-product credits (the VOC includes chemicals, water and other consumables plus waste and disposal costs); twenty-five percent of full-capacity fuel cost for one month; and two percent of the total plant investment. Inventory capital reflects the inventory required for fuel and other consumables needed

² Based on 5.0%/yr cost escalation and 11.5%/yr AFDC interest rate

to start-up the modified power plant. This cost is estimated as 60 days variable operating cost, excluding by-product credits. The initial cost of catalyst and chemicals contained in the process equipment at start-up is to be included in the initial catalyst and chemical cost. The Total Capital Cost is computed as the sum of items D,E,F,G, and H.

The second part of Worksheet 5, operating and maintenance requirements, considers only fixed costs. By convention, all operating and maintenance labor and materials appear in the fixed O&M category. Total annual maintenance cost, item J, is estimated as a percentage of the replacement cost of the individual sections in the plant. The annual maintenance cost for each plant section, which includes labor and materials, is to be estimated by the following expression.

$$\text{Plant Section Annual Maintenance Cost} = (\text{Maintenance Factor}) * \\ (\text{New Plant Installed Equipment Cost})$$

The total annual maintenance cost is obtained by summing all annual maintenance costs for each plant section. Recommended maintenance factors, based on the type of processing conditions within a given section, are given in Table 11. New plant installed equipment costs by plant section are found in column 5 of Worksheet 4A.

The total annual fixed O&M cost, item L, is considered to be a function of the annual maintenance cost and the operating labor cost. Annual operating labor cost (MM\$) is based on the number of operators per shift. The number of operators per shift is to be entered in item K. The total annual operator hours is the product of the number of operators/shift and the number of hours per year (8760). The annual operating labor cost is the product of the operator hours and the operating labor rate per hour. The annual operating cost must be converted to MM\$. The operating labor rate is given in Table 10. Use the following expression:

$$\text{Operating Labor Cost, MM\$} = (\text{number op./shift}) * (8760) * (\text{labor payrate, \$/hr}) \\ * 10^{-6}$$

The calculated annual operating labor cost is to be entered in item K. The total annual fixed O&M cost is then calculated from the following expression:

$$\begin{aligned}\text{Total Annual Fixed O\&M} &= 1.12 * (\text{Annual Maintenance Cost}) \\ &+ 1.3 * (\text{Operating Labor Cost})\end{aligned}$$

The calculations are based on a 40% labor / 60% materials maintenance cost ratio and an annual administrative and support labor requirement that is 30 % of the sum of the maintenance and labor costs, if other is not available.

TABLE 10
OPERATING COST VALUES¹
(1988 \$)

Item	Value/Units
OPERATING LABOR PAY RATE	\$23.00/HR
<u>Commodities:</u> All costs delivered to plant sites except as noted	
FUELS	
FUEL OIL (NO. 2)	\$ 0.53/GAL
FUEL OIL (NO. 6)	\$ 0.48/GAL
METHANE	\$ 2.47/1000 FT ³
BITUMINOUS COAL (UP TO 1% SULFUR, HHV=12,415 BTU/LB)	\$40.00/TON
BITUMINOUS COAL (1.0 TO 2.0 % S, HHV=12,369 BTU/LB)	\$35.00/TON
BITUMINOUS COAL (MORE THAN 2% S, HHV=11,619 BTU/LB)	\$30.00/TON
SUBBITUMINOUS COAL (0.4% S, HHV=8,909 BTU/LB)	\$ 7.00/TON (F.O.B MINEMOUTH)
LIGNITE (0.8% S, HHV=6,377 BTU/LB)	\$ 8.00/TON (F.O.B MINEMOUTH)
WATER/STEAM	
CONDENSATE	\$0.75/1000 LB
RAW WATER	\$0.60/1000 GAL
COOLING WATER	\$0.16/1000 GAL
STEAM	
LOW PRESSURE (0 - 70 psia)	\$2.85/1000 LB
MEDIUM PRESSURE (70 - 250 psia)	\$3.50/1000 LB
HIGH PRESSURE (250 - 2400 psia)	\$5.30/1000 LB
POWER	
PARASITIC POWER	\$0.050/KWHR
INCREMENTAL REPLACEMENT POWER COST	\$0.035/KWHR
SORBENTS/CHEMICALS	
CATALYST (COPPER OXIDE)	\$3250.00/TON
AMMONIA	\$ 145.00/TON
LIME	\$ 55.00/TON
LIME (HYDRATED)	\$ 59.00/TON
LIMESTONE	\$ 15.00/TON
NAHCOLITE	\$ 45.00/TON
EDTA	\$ 790.00/TON
TRONA	\$ 140.00/TON
LIQUID OXYGEN	\$ 117.00/TON
ALLIED CATALYST	\$2500.00/TON
CLAUS CATALYST	\$1000.00/TON
cont. SORBENTS/CHEMICALS	
PHOSPHORIC ACID	\$ 530.00/TON
SELEXOL ABSORBENT	\$ 11.80/GAL

DIATOMACEOUS EARTH	\$ 65.00/TON
LAND	\$6500.00/ACRE
FABRIC FILTER BAGS	\$ 1.00/ft ²

****WASTE DISPOSAL CHARGES****

DRY SOLIDS (TRUCKED-LANDFILL)	\$ 9.29/TON
FLY ASH (TRUCKED-LANDFILL)	\$ 8.00/TON
GYP SUM (TRUCKED-LANDFILL)	\$ 4.75/TON
SLUDGE	\$ 10.00/TON

****BY-PRODUCT CREDIT****

SULFUR		\$ 90.00/LONG TON
FERTILIZER ²	\$ 113.00/TON	
SULFURIC ACID		\$ 50.00/TON
METHANOL		\$ 0.32/GAL
AMMONIA		\$ 145.00/TON

¹ Any commodity may be sold for 80% of its "cost value"

² Due to variety and grade of fertilizer, proposer should specify fertilizer composition and propose cost value if different from that noted above.

TABLE 11
Maintenance Data

Type of Processing Conditions Within Plant Section	Annual Maintenance Factor*
Corrosive and Abrasive Slurries	0.06
Solids at High Pressure and/or High Temperature	0.04
Solids at Low Pressure and/or Low Temperature	0.04
Liquids and Gases	0.02
Utilities	0.01

* As a fraction of installed cost.

Worksheet 6: Variable Operating Costs

By convention, only consumed and produced commodities appear in the variable cost. Quantity and type of commodities consumed and produced in the modified power plant are to be based on information given in Worksheet 3. Variable costs include sorbents/chemicals, water, steam, auxiliary power, and waste disposal. Table 10 provides DOE's operating unit cost values to be used in calculation of the variable operating cost. The proposer may derive alternative estimates of variable costs if justified. Such alternative costs must be documented with supporting material. Proposers may take credit for by-products as indicated in Table 10. Any credit taken must be explained.

Cost of coal should not normally be included as a variable cost for repowering technologies. DOE will compute this cost. The cost of any supplementary fuel such as gas, oil, or special coal (e.g., of low sulfur content) used in either retrofitting or repowering must be included, however. For instance, certain retrofit technologies use supplementary fuels for sorbent regeneration or reburning. When a supplementary fuel is used, explanation must be included as to how its use affects the feed rate of the coal that constitutes the major fuel to the boiler.

Worksheets 7A - 7F: Industrial Boilers and Processes

The worksheets in this series are intended for the industrial boilers and processes category (mild gasification, coal liquefaction, etc.), which will be evaluated separately from the electric utility and coal cleaning/upgrading proposals. These worksheets generally follow Worksheets 1B, 2, 3, 4B, 5, and 6, and the general directions for completing these worksheets would apply. The Worksheet series 7A through 7F should be completed twice, once for the baseline technology, and once for the proposed technology that will replace and improve the baseline technology. In completing Worksheet 7A proposers should note the requirements for high or low rank coals under the instructions for Worksheet 1B.

ATTACHMENT A OF APPENDIX I

REFERENCE POWER PLANTS, REFERENCE COAL, AND WORKSHEET INSTRUCTIONS

This Attachment describes a 300 MWe reference power plant. It provides an analysis of the reference coal in Table 2. It provides information about the reference coal of use to proposers of physical beneficiation processes in Tables 7 through 9. Table 7 provides size and chemical analyses, Table 8 provides detailed washability analyses for coal crushed to 1-1/2 inch top size, and Table 9 provides detailed washability analyses for coal crushed to 3/8 inch top size.

A.1 General Description of Reference Power Plant

The reference power plant is an existing plant which is to serve as the basis for generating a base case for the proposed clean coal technology. The reference power plant is a subcritical, pulverized coal-fired plant that is nominally 300 MWe (net) in size, with no provision for SO₂ and NO_x emission control. The reference plant design[s] described in this document is based on modifications of a conceptual design presented in a report by Argonne National Laboratory.

The reference plant is located in the East Central Region of the continental United States. Site conditions are given in Table 1. The power plant is 30 years old and in average condition for its age. It is intended that the proposed retrofit or repowering be a part of a general plan to extend the plant's expected operational lifetime to 60 years.

TABLE 1
Site Conditions for Reference Plant

600 Feet Elevation	Dry Bulb Design Temperature, 60°F
Seismic Zone 1	Wet Bulb Design Temperature, 52°F
Pile Foundations as Required	Maximum Dry Bulb Temperature, 95°F
River Water Supply	Maximum Wet Bulb Temperature, 75°F
Rail Access	Minimum Temperature, -10°F
14.4 psia, Ambient Design Pressure	

- * "Design of Advanced Fossil Fuel Systems: A Study of Three Developing Technologies for Coal-Fired, Base-Load Electric Power Generation, Pulverized, Coal-Fired Power Plant with a Wet Limestone Flue Gas Desulfurization System." Prepared by Bechtel Group, Inc., For Argonne National Laboratory, Report Number ANL/FE-83-10.

Coal is delivered by unit train. Provision for a 60-day dead coal storage area is included on site. Live storage retrieval and conveyors deliver 300 tons per hour (tph) of coal to two 300 tph crushers. The crushed coal is conveyed to the distribution bins. At design conditions, the reference unit consumes 118 tph of coal; the analysis of the reference coal (a simulated Upper Freeport coal, Armstrong County, Pennsylvania) is presented in Table 2.

TABLE 2
Reference Coal Analysis

<u>Proximate Analysis</u> <u>(AR Basis), % wt</u>		<u>Sulfur Forms, % wt</u>	
Volatile Matter	30.6	Pyritic	1.5
Fixed Carbon	50.0	Organic	0.9
Ash	16.4	Sulfate	<u>0.1</u>
Moisture	<u>3.0</u>		2.5
	100.0	<u>Ash Fusion, °F</u>	
<u>Ultimate Analysis</u> <u>(AR Basis), % wt</u>		Initial Deformation	2,200
Moisture	3.0	Softening (H = W)	2,275
Carbon	67.5	Fluid	2,400
Hydrogen	4.6	<u>Other Parameters</u>	
Nitrogen	1.2	Gross Heating Value,	
Chlorine	0.1	Btu/lb (AR Basis)	12,360
Sulfur	2.5	Grindability, Hardgrove	58.0
Oxygen	4.7	Total Sulfur, % wt	2.50
Ash	<u>16.4</u>	Free Swelling Index	7.5
	100.0		

The turbine throttle steam conditions are nominally 2,400 psig and 1,000°F, with 1,000°F reheat. The maximum rated capacity of the power plant could be approximately 10 percent higher than rated with the turbine throttle valves wide open and 5 percent over-pressure, if selected balance of plant equipment items were sized to accommodate this operating condition. A plot plan of the approximately 360 acre site is presented in Figure 1.

A.1.1 Power Plant Equipment

Arrangement drawings, Figures 2, 3, and 4, show the major equipment location within modules in the reference plant. Table 3 provides data on the mechanical equipment in the plant. The following descriptions provide additional detail for major plant modules.

The turbine-generator module is in good condition and does not need refurbishment. It is located in a fully enclosed 96 by 190 foot structure containing the turbine generator and its related equipment. An auxiliary bay runs the length of the building. A bay at the front end of the turbine generator accommodates main steam and reheat piping. A bay at the generator end permits generator rotor removal. The turbine building is approximately 100 feet high.

Superheated steam for the turbine-generator is supplied by a drum-type, forced-circulation, balanced-draft, dry-bottom boiler designed for operation using pulverized coal with startup on light fuel oil. The enclosure of the boiler is designed with the water-cooled walls. The unit contains 19 horizontally-opposed, wall-fired burners. Each burner's capacity is 180 million Btu/hr. The plan area heat release rate (the amount of heat generated per square foot of boiler plan area at the upper fuel burner level) is 1.5 million Btu/hr.-ft². The upper furnace gas residence time is 0.8 seconds.

Ducts between the air heater and the electrostatic precipitator (ESP) are sized for a gas velocity of 3,600 fpm. Gas residence time in this ductwork and the ESP manifold is 1.5 seconds. The reference plant stack is 600 feet in height and consists of a concrete chimney with an acid brick liner.

Bays on either side of the boiler contain coal silos, feeders, and pulverizers. The remaining space is reserved for the boiler, combustion air ducts, and coal pipes. Space at the back of the boiler is reserved for the boiler-to-air heater duct transition and for the air preheaters above the fan room containing the forced draft and primary air fans.

Five, 48 tph coal pulverizers are on the ground floor, three on each side of the boiler. Gravimetric-type coal feeders are on the feeder floor above the coal pulverizers. The coal silos are above the coal feeders. Each silo feeds one pulverizer. The coal conveyors are above the silos. A gallery housing the surge bin and the feed conveyors is located behind the boiler above the ducts in the duct transition bay.

The bottom ash hopper is on the ground floor under the boiler. The pulverizer reject-storage tank and transfer tanks are also on the ground floor, underneath the heat recovery section of the boiler. The economizer ash collection tank is located directly under the economizer hoppers. Bottom ash handling pumps, ash sluice water booster pumps, and ash sump pumps are on the ground floor near the ash storage and transfer tanks.

The following equipment is located within the water treatment module: domestic water treatment system, makeup demineralizer, raw water pretreatment system, wastewater treatment plant, offices and laboratory, and sewage treatment system.

The electrostatic precipitator (ESP) module contains all of the equipment necessary to operate the cold, rigid frame ESP. Particulate emissions are controlled to 0.10 lb/MMBtu.

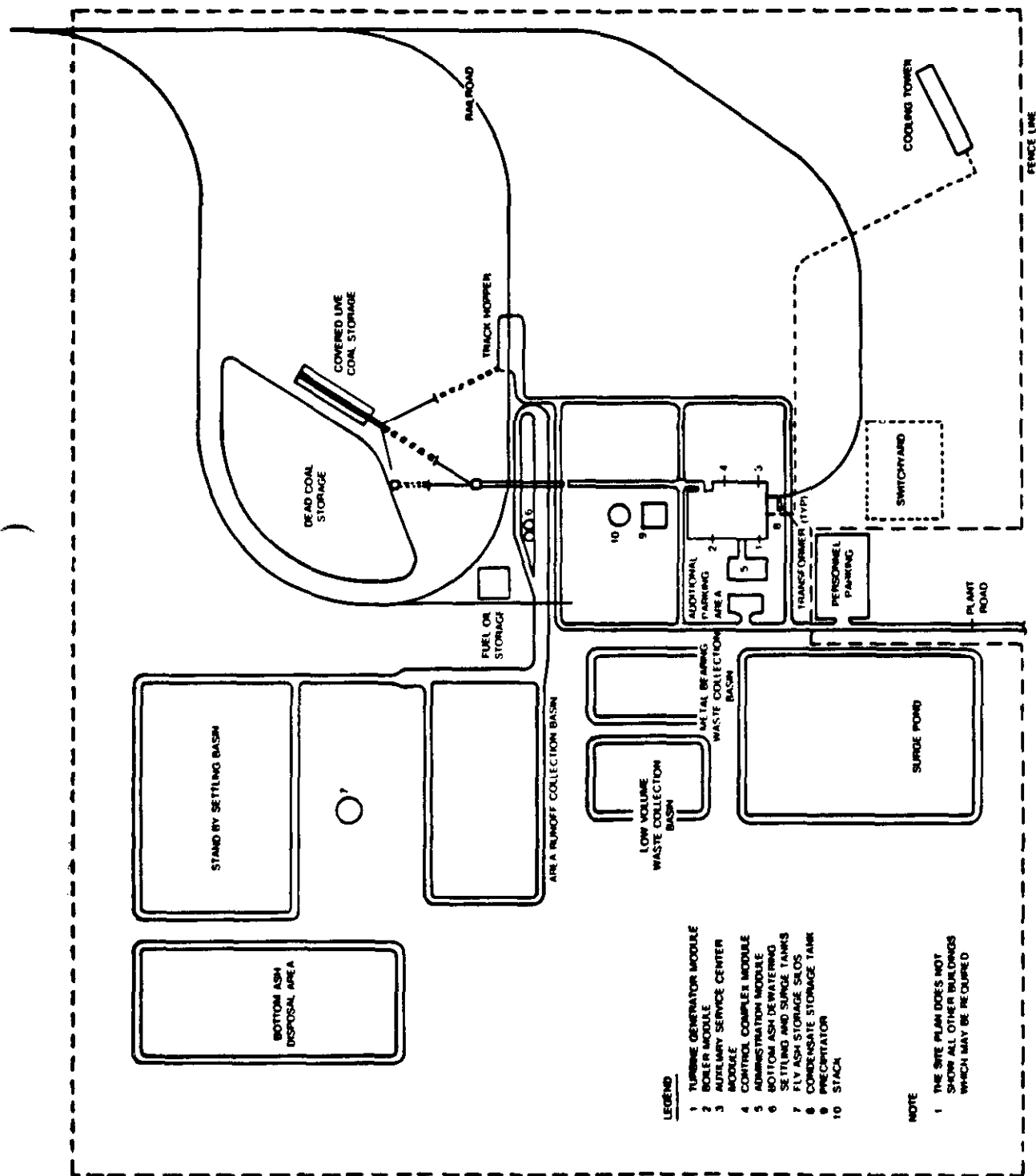


Figure 1. Reference Plant Site Plan

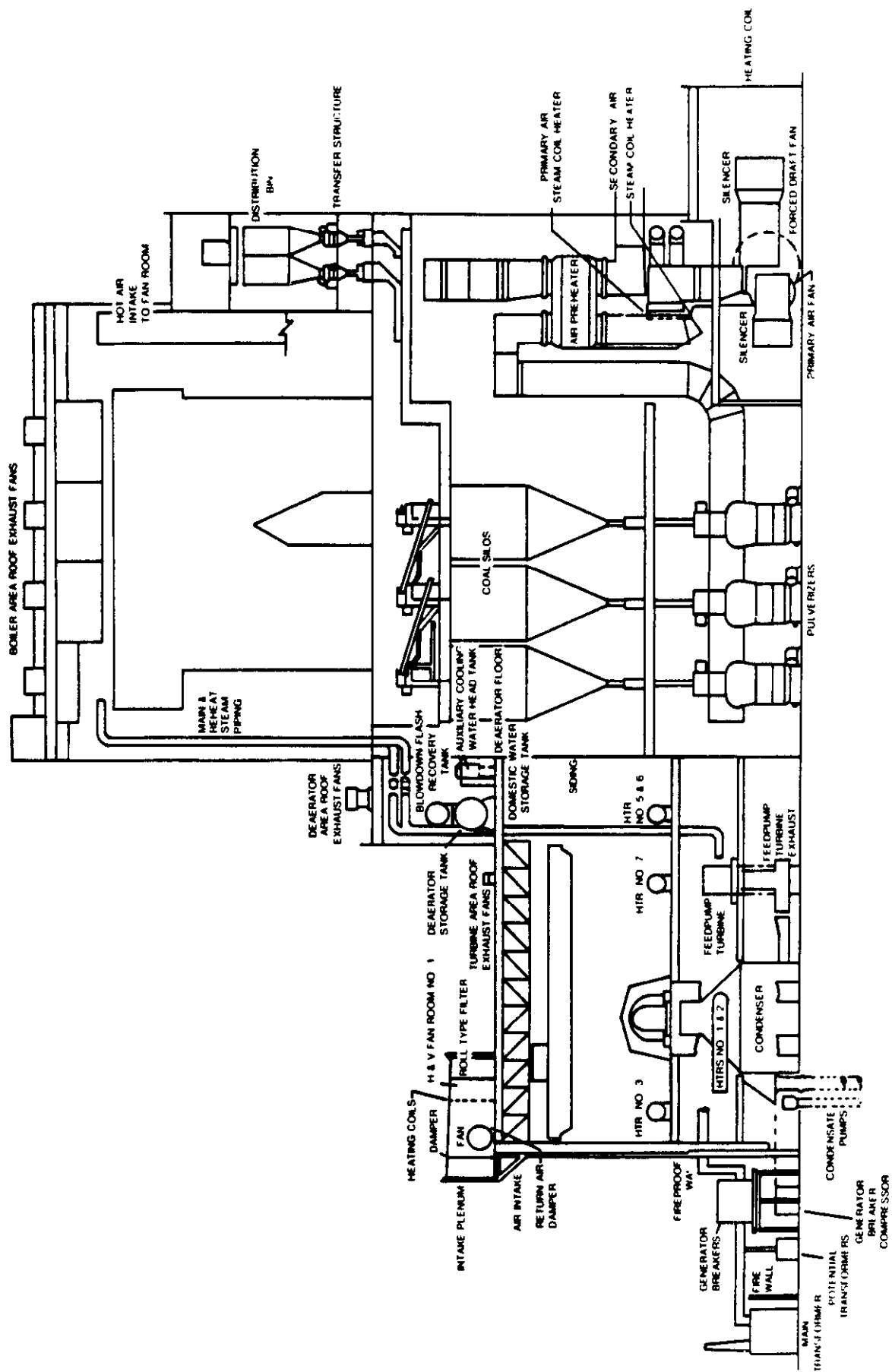


Figure 2. 300 MWe Reference Plant Arrangement Elevation

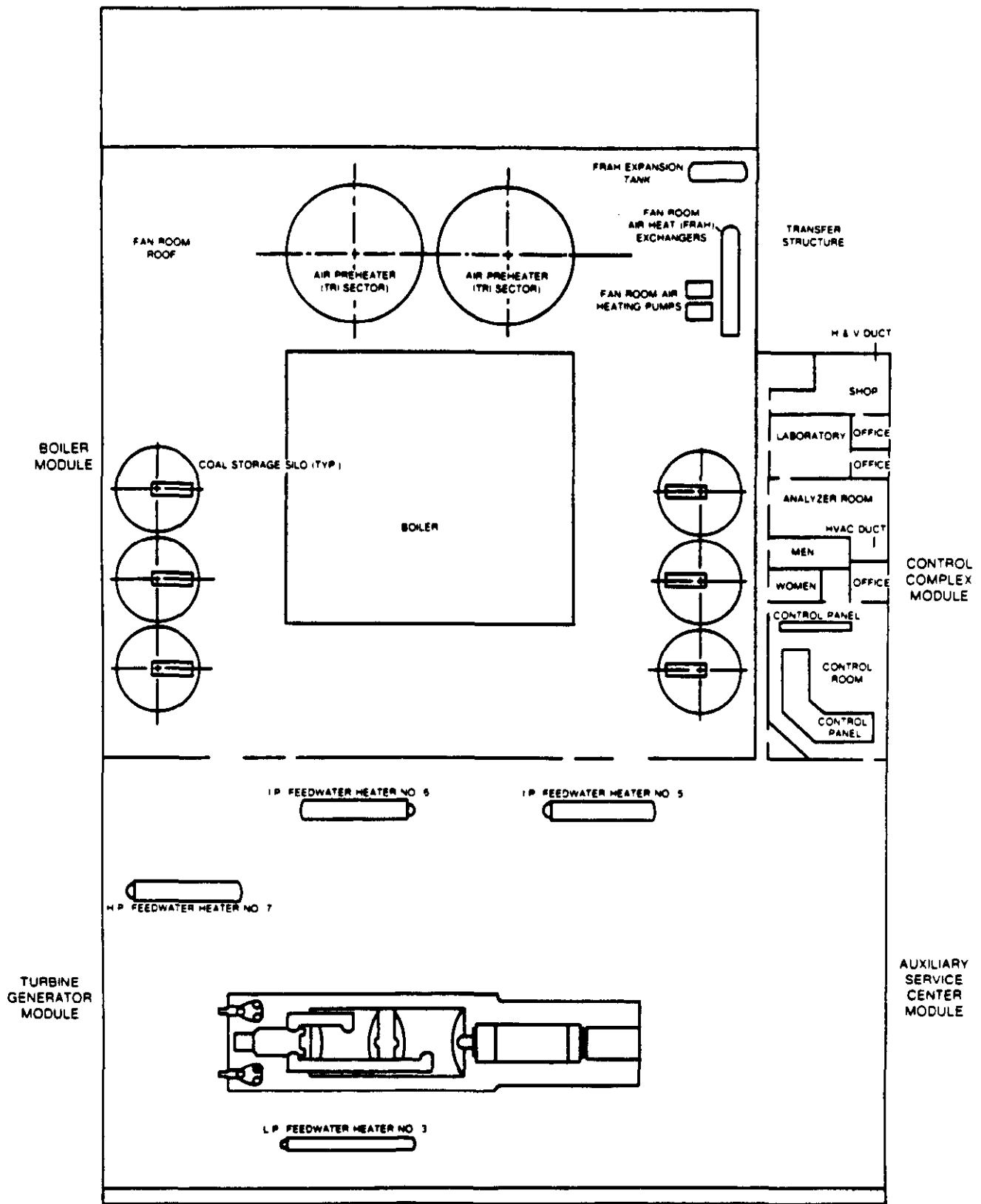


Figure 3. 300 MWe Reference Plant Arrangement Plan Operating and Feeder Floor

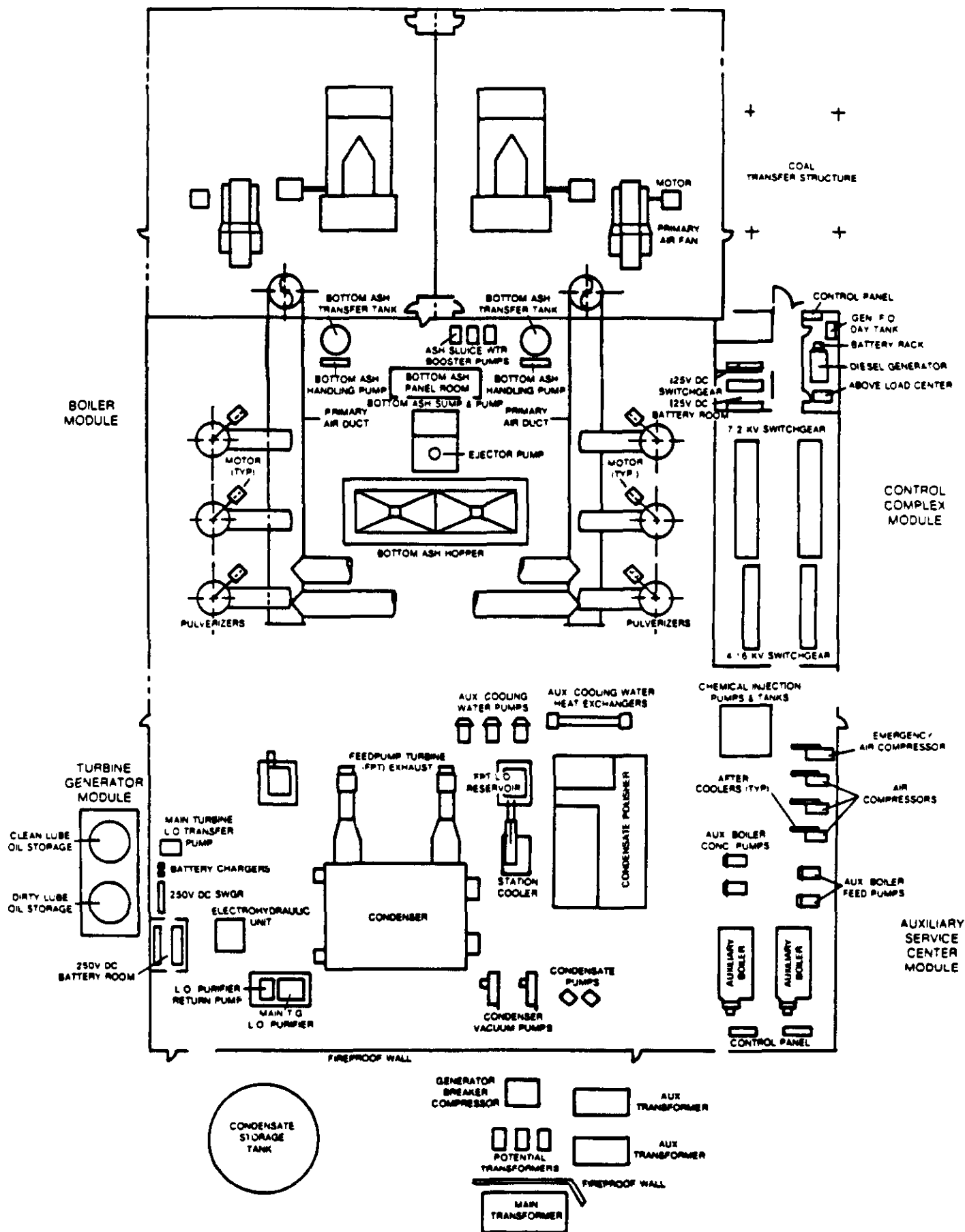


Figure 4. 300 MWe Reference Plant Arrangement Plan Ground Floor

TABLE 3A
Reference Plant Mechanical Equipment Data
300 MWe Reference Plant

<u>Steam Generator</u>		<u>Condenser</u>	
Type	Balanced draft, direct fired, pulverized coal.	Shells	2
		Surface - (Ft ²)	141,000
		<u>Feedwater Heaters</u>	
Main steam - (10 ³ lb/hr)	1,813	Number of stages	7 stages,
- (psig/°F)	2,520/1,005		6 closed,
Reheat - (10 ³ lb/hr)	1,668		1 open
- (°F)	1,005		
<u>Turbine Generator</u>		<u>Boiler Feedwater Pumps</u>	
Frame size, last stage blade	25"	Number/driver	2/turbine
Generator rating - (MVA/PF)	380/0.85	Total HP - (both)	10,500
Exhaust	2.0" HgA	Flow ea - (GPM/%)	3,000/50
Rated Capacity, Net/Gross(MW)	306/322	<u>Circulating Water</u>	
<u>Auxiliary Boiler</u>		Total flow - (GPM)	110,000
No./type/fuel	1/package/ No. 2 oil	Cooling source	Cooling Towers
Design rating - (10 ³ lb/hr)	100	Ambient temp./degree rise - (°F)	60/30
- (psig/°F)	150/500	No. pumps/HP	2/1,500
<u>Fans</u>		<u>Precipitator</u>	
Forced draft - (No./driver)	2/motor	Type:	Electrostatic
Primary air - (No./driver)	2/motor	Emissions (lb/MM Btu)	0.10
Induced draft - (No./driver)	2/motor	Specific Collector	
		Area-(Ft ² /1000 ACFM)	200
<u>Coal-Handling Facilities</u>		<u>Main Power Transformers</u>	
Type	Rotary dump	Number/type (ea/No. phases)	4/1 (1-spare)
Unloading rate -(No.Belts/tph)	1/3,000	MVA/Temp Rise	380/65°F
Reclaiming rate - (No. belts/tph)	3/200	Voltage - kV/kV	24/345
<u>Ash-Handling Facilities</u>		<u>Switchyard</u>	
Bottom ash unloading - tph	5	Breakers - No.	6
Storage	Dewatering pond	Size - kV	345
Fly ash unloading - tph	20		
Storage	Silo		

A.1.2 Plant Performance Assumptions

Overall performance parameters for the reference power plant are given in Table 4. The net plant heat rate includes an allowance of 6 percent for plant auxiliaries. The addition of a clean coal technology may result in a change in the net plant electrical output due to the consumption or production of power and steam. Similarly, the reference plant availability factor of 75% may change as a result of retrofit/repowering due to changes in both plant reliability and scheduled maintenance periods. The reference power plant boiler is uncontrolled with regard to SO₂ and NO_x emissions. It is assumed that 95 percent of the coal sulfur is converted to SO₂, resulting in emissions of 3.8 lb. SO₂/MM Btu. Conventional, wall-fired burners are utilized with no combustion modifications for NO_x reduction. Total NO_x emissions (as NO₂) are 1.2 lb/MMBtu. A schematic of the flue gas flow through the boiler at full load design conditions is shown in Figure 5. Ash flow rates are shown in Table 5. In Table 6, flue gas compositions are given at two different locations in the boiler ductwork. The molecular weight of the flue gas is 29.7.

TABLE 4

Reference Power Plant Performance Parameters

Steam Cycle Heat Rate, Btu/kWh	7,914
Boiler Efficiency, %	87.7
Gross Heat Rate, Btu/kWh	9,024
Net Heat Rate, Btu/kWh	9,493
Coal Burn Rate, tph	117.6
Net Output, MWe	305.7

TABLE 5

Reference Power Plant Ash Flow Rates (Dry Basis)

	<u>Tons Per Hour</u>
Furnace Bottom Ash	3.84
Economizer Ash	1.44
Mill Rejects (Pyrites)	0.24
Fly Ash	<u>13.68</u>
Total	19.20

TABLE 6
Reference Power Plant
Flue Gas Composition

	<u>At Economizer Outlet</u>		<u>At Air Heater Outlet</u>	
	% - Volume	lb/hr	% - Volume	lb/hr
O ₂	3.2	99,600	4.5	150,120
CO ₂	13.8	582,000	12.8	582,000
H ₂ O	8.0	138,360	7.6	141,180
N ₂	74.7	2,003,940	74.9	2,170,980
	<u>PPM</u>	<u>lb/hr</u>	<u>PPM</u>	<u>lb/hr</u>
SO ₂	1,803	11,040	1,669	11,040
SO ₃	19	148	18	148
HCl	67	235	62	235
NO	752	2160	696	2160
NO ₂	40	175	37	175
Total		2,837,658		3,058,038

TABLE 7
SIZE AND CHEMICAL ANALYSES OF A SIMULATED UPPER FREEPORT
COALBED CRUSHED TO 1-1/2 INCH AND 3/8 INCH TOPSIZES

(INCH/WESE)	DIRECT ANALYSIS				CUMULATIVE ANALYSIS			
	WEIGHT (%)	ASH (%)	TOTAL SULFUR (%)	PYRITIC SULFUR (%)	CALORIFIC VALUE (BTU/LB)	WEIGHT (%)	ASH (%)	TOTAL SULFUR (%)
1 1/2 X 3/4	19.0	24.7	2.49	1.59	11135	19.0	24.7	2.49
3/4 X 3/8	25.1	16.6	2.51	1.50	12459	44.1	20.1	2.50
3/8 X 28	43.7	13.6	2.51	1.48	12981	87.8	16.9	2.51
28 X 100	7.6	12.5	2.38	1.36	13194	95.4	16.5	2.50
-100	4.6	14.2	2.49	1.95	12769	100.0	16.4	2.50
3/8 X 14	62.4	18.4	2.56	1.58	12265	62.4	18.4	2.56
14 X 28	13.8	13.0	2.38	1.34	13148	76.2	17.4	2.53
28 X 100	15.2	11.8	2.36	1.32	13360	91.4	16.5	2.50
-100	8.6	14.1	2.34	1.85	12787	100.0	16.3	2.49

TABLE 8
DETAILED WASHABILITY ANALYSES OF A SIMULATED UPPER FREEPORT
COALBED CRUSHED TO A 1 1/2 INCH TOP SIZE

SPECIFIC GRAVITY	DIRECT ANALYSIS				CUMULATIVE ANALYSIS			
	TOTAL		PYRITIC SULFUR		TOTAL		PYRITIC SULFUR	
	WEIGHT (%)	ASH (%)	SULFUR (%)	CALORIFIC VALUE (BTU/LB)	WEIGHT (%)	ASH (%)	SULFUR (%)	CALORIFIC VALUE (BTU/LB)
1-1/2 INCH X 3/4 INCH X 100 MESH								
FLOAT - 1.30	25.0	5.4	0.50	14376	25.0	5.4	0.60	14376
1.30 - 1.35	16.1	9.1	1.03	13693	41.1	6.8	0.77	14108
1.35 - 1.40	14.9	14.9	1.14	12644	56.0	9.0	0.87	13719
1.40 - 1.50	11.9	24.1	1.94	11032	67.9	11.6	1.06	13248
1.50 - 1.60	5.2	32.2	2.05	9666	73.1	13.1	1.13	12993
1.60 - 1.90	12.2	35.3	2.20	9157	85.3	16.3	1.28	12444
1.90 - 2.20	1.2	42.9	5.73	7939	86.5	16.6	1.34	12382
SINK - 2.20	13.5	76.0	3.15	3145	100.0	24.7	1.59	11135
(19.9% OF 1-1/2 INCH X 3/4 INCH X 100 MESH)								
3/4 INCH X 3/8 INCH X 100 MESH								
FLOAT - 1.30	37.9	4.5	0.52	14543	37.9	4.5	0.52	14543
1.30 - 1.35	22.2	9.4	0.85	13638	60.1	6.3	0.64	14209
1.35 - 1.40	13.4	14.6	1.57	12698	73.5	7.8	0.81	13933
1.40 - 1.50	9.1	23.6	2.50	11118	82.6	9.6	1.00	13623
1.50 - 1.60	2.9	30.4	3.21	9966	85.5	10.3	1.07	13499
1.60 - 1.90	6.4	36.9	3.26	8897	91.9	12.1	1.22	13179
1.90 - 2.20	1.3	40.0	6.06	8399	93.2	12.5	1.29	13112
SINK - 2.20	6.8	73.3	4.42	3505	100.0	16.6	1.50	12459
(26.3% OF 3/4 INCH X 3/8 INCH X 100 MESH)								

DETAILED	TABLE 8 (CONTINUED)				UPPER SIZE
	WASHABILITY COALBED	ANALYSES CRUSHED	OF A TO A 1 1/2	SIMULATED INCH	
					PRESPORT

DIRECT ANALYSIS				CUMULATIVE ANALYSIS						
SPECIFIC GRAVITY	WRIGHT (%)	ASH (%)	TOTAL SULFUR (%)	PYRITIC SULFUR (%)		CALORIFIC VALUE (BTU/LB)	TOTAL SULFUR (%)		PYRITIC SULFUR (%)	CALORIFIC VALUE (BTU/LB)
				3/8 INCH of 1-1/2 INCH X 100 MESH	28 MESH		ASH (%)	WEIGHT (%)		
1.30	51.9	4.3	1.47	0.32	14581	51.9	4.3	1.47	0.32	14581
1.35	18.4	9.3	1.80	0.70	13656	70.3	5.6	1.56	0.42	14339
1.40	9.2	13.8	2.49	1.45	12841	79.5	6.5	1.66	0.54	14166
1.50	6.3	21.8	3.65	2.68	11429	85.8	7.7	1.81	0.70	13965
1.60	2.6	28.9	4.58	3.69	10217	88.4	8.3	1.89	0.78	13854
1.90	4.3	38.3	6.30	5.61	8671	92.7	9.7	2.10	1.01	13614
2.20	1.3	39.9	7.78	7.21	8414	94.0	10.1	2.17	1.09	13542
SINK	6.0	68.3	7.79	7.55	4186	100.0	13.6	2.51	1.48	12981
28 MESH X 100 MESH										
				(8.0%	of 1-1/2 INCH X 100 MESH)					
1.30	57.4	3.0	1.44	0.29	14824	57.4	3.0	1.44	0.29	14824
1.35	13.8	7.7	1.60	0.50	13950	71.2	3.9	1.47	0.33	14655
1.40	6.8	13.2	2.09	1.05	12949	78.0	4.7	1.52	0.39	14506
1.50	5.1	21.1	3.20	2.23	11551	83.1	5.7	1.63	0.51	14325
1.60	3.2	24.9	3.43	2.54	10895	86.3	6.4	1.69	0.58	14197
1.90	4.4	28.4	3.55	2.86	10301	90.7	7.5	1.78	0.69	14008
2.20	1.7	37.7	5.06	4.49	8768	92.4	8.0	1.84	0.76	13912
SINK	7.6	66.3	8.83	8.59	4464	100.0	12.5	2.38	1.36	13194

DETAILED	WASHABILITY	ANALYSIS	OF A	SIMULATED	UPPER	FREEPORT
	COALBED	CRUSHED	TO A	1 1/2	INCH	TOP SIZE

SPECIFIC GRAVITY	DIRECT ANALYSIS			CUMULATIVE ANALYSIS						
	WEIGHT (%)	ASH (%)	TOTAL SULFUR (%)	PYRITIC SULFUR (%)	CALORIFIC VALUE (BTU/LB)	WEIGHT (%)	ASH (%)	TOTAL SULFUR (%)	PYRITIC SULFUR (%)	CALORIFIC VALUE (BTU/LB)
				(100.0%	1-1/2 of TOTAL	INCH 1-1/2	INCH X O)			
FLONT	- 1.30	43.3	4.3	1.55	0.40	14574	43.3	1.55	0.40	14574
	- 1.35	18.6	9.2	1.89	0.79	13674	61.9	1.65	0.51	14304
	- 1.40	11.2	14.3	2.43	1.39	12749	73.1	1.77	0.65	14065
	- 1.50	8.1	22.9	3.36	2.39	11226	81.2	1.93	0.82	13783
	- 1.60	3.2	30.0	3.85	2.96	10036	84.4	2.00	0.90	13639
	- 1.90	6.4	36.2	4.25	3.56	9003	90.9	2.16	1.09	13311
	- 2.20	1.3	40.2	6.93	6.36	8360	92.2	2.23	1.17	13241
SINK	- 2.20	7.8	72.0	5.65	5.41	3695	100.0	2.50	1.50	12493
INUS	100 MESH	4.6	14.2	2.49	1.95	12769	100.0*	2.49*	1.52*	12506*

* These are cumulative values for the FLOAT-SINK Plus the Minus 100 MESH.

DETAILED	WASHABILITY	TABLE 9		ANALYSES OF A	SIMULATED	UPPER	PREPARED
	COALBED			CRUSHED	TO A 3/8	INCH	TOP SIZE

[illegible]

DETAILED	WASHABILITY	TABLE 9 (CONTINUED)			ANALYSES OF A SIMULATED	UPPER	FREEPORT
	COALED	CRUSHED	TO A	3/8	INCH	TOP	SIZE

[illegible]

* These are cumulative values for the FLOAT-SINK plus the MINUS 100 MESH

TABLE 9A
 DETAILED WASHABILITY ANALYSES OF A SIMULATED UPPER FREEPORT
 COALBED CRUSHED TO A 28 AND 200 MESH TOP SIZES

DIRECT ANALYSIS						CUMULATIVE ANALYSIS							
SPECIFIC GRAVITY	WEIGHT (%)	ASH (%)	TOTAL		PYRITIC SULFUR (%)	CALORIFIC VALUE (BTU/LB)	28 MESH X 0 of TOTAL (100.0%)	WEIGHT (%)	ASH (%)	TOTAL		PYRITIC SULFUR (%)	CALORIFIC VALUE (BTU/LB)
			SULFUR (%)	(%)						SULFUR (%)	(%)		
FLOAT - 1.27	51.7	3.7	1.42	0.27	14693		51.7	3.7	1.42	0.27	14693		
- 1.30	13.9	8.8	1.66	0.57	13748		65.6	4.8	1.47	0.33	14493		
- 1.40	15.6	17.2	2.13	1.14	12235		81.2	7.2	1.60	0.49	14059		
- 1.60	9.0	38.6	3.52	2.78	8623		90.2	10.3	1.79	0.72	13517		
- 1.80	2.8	56.9	5.47	4.95	5810		93.0	11.7	1.90	0.84	13285		
SINK - 1.80	7.0	80.1	10.41	10.17	2610		100.0	16.5	2.50	1.50	12537		
200 MESH X 0 of TOTAL (100.0%)													
FLOAT - 1.27	50.7	3.1	1.36	0.20	14805		50.7	3.1	1.36	0.20	14805		
- 1.30	2.8	5.6	1.48	0.35	14338		53.5	3.2	1.37	0.21	14781		
- 1.40	16.8	7.5	1.58	0.47	13987		70.3	4.2	1.42	0.27	14591		
- 1.60	14.8	15.6	2.13	1.12	12519		85.1	5.2	1.54	0.42	14231		
- 1.80	4.1	33.1	3.05	2.25	9518		89.2	7.4	1.61	0.50	14014		
SINK - 1.80	10.8	91.5	9.83	9.73	1187		100.0	16.5	2.50	1.50	12629		

APPENDIX J

INFORMATION REQUIREMENTS FOR THE NATIONAL ENVIRONMENTAL POLICY ACT

NOTE: The information described in this Appendix need not be submitted with the proposal.

This Appendix is intended for the proposer's information to assist with planning the project. The information discussed herein will be required after selection.

Information Requirements for the National Environmental Policy Act

The Participant must develop and deliver to DOE a detailed, self-contained Volume of Environmental Information describing the environmental aspects and projected impacts of the project. This information is necessary in order for DOE to fulfill its responsibilities under the National Environmental Policy Act of 1969 (NEPA). In meeting those responsibilities, DOE is required to conform to the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, 40 CFR Parts 1500-1508 and DOE Regulations for implementation of NEPA (10 CFR Part 1021). It should be noted that DOE's NEPA responsibilities must be fulfilled before it can share project costs beyond Phase 1 project activities. To minimize the risk of project delays, therefore, it is imperative that the Participant consider carefully the effort and schedule required to prepare the Volume of Environmental Information described herein.

This Appendix is intended to provide guidance to the Participant concerning the types and extent of information required, but is not to be interpreted as containing all necessary or sufficient requirements for any given project. In some cases, the guidance may not be applicable to the Participant's project while, in other cases, the detail given may not be sufficient to cover all applicable environmental, health, safety, and socioeconomic impacts. The level of information should be compatible with the nature of the project and its stage of development. The Participant should keep in mind, however, that the environmental information required must be sufficient for DOE to prepare the appropriate documentation necessary to fulfill its obligation under NEPA to fully disclose the environmental impacts that DOE foresees as a consequence of any particular project.

Guidelines for the content of the Volume of Environmental Information follow.

SUMMARY

The Participant should prepare a short summary of the environmental, health, safety, and socioeconomic information and analysis. The summary should focus on:

- o the potential beneficial and detrimental environmental, health, safety, and socioeconomic impacts which will result from the project;
- o the major environmental, health, safety, and socioeconomic risks to construct, operate, maintain, and dismantle or dispose of the proposed facility;
- o conclusions which can be made about the significance of predicted environmental, health, safety, and socioeconomic effects;
- o anticipated near-term changes or additions covered by applicable environmental and other regulations, and related plans to use best control technology and practices economically feasible to meet the anticipated requirements;
- o alternatives available for meeting regulations and mitigating impacts; and,
- o all unresolved environmental, health, safety, and socioeconomic issues and unquantifiable effluents/emissions which may affect the validity of the impact analysis, especially the details for which information is not available at this stage of project development.

PROPOSED ACTION AND ITS ALTERNATIVES

This section should provide the following information as it relates to facility requirements, overall plant site and setting, and the plant/process residuals, as appropriate. The description should be sufficient to identify potential environmental impacts.

- o Project resource requirements, including energy form and quantity, land, water, labor, construction and operation materials, etc.

- o Project site plan and topographic maps, if appropriate, including:
 - description of physical setting, structures, transportation corridors, and nearby bodies of water
 - description of fuel and waste storage areas, drainage and runoff patterns
- o Offsite facility requirements including:
 - depth of ground water,
 - location of floodplains and wetlands
 - pipelines and transmission lines,
 - transportation access (rail, road, barge),
 - water intake and discharge, and
 - waste treatment disposal or recycling/reuse facilities.
- o In-plant and off-site discharges, and on-site waste storage during construction, operation, maintenance, and disposition of the project including
 - quantity, physical and chemical description of air emissions (including fugitive emissions), liquid effluents, solid wastes, and other discharges (including heat, noise, and odor).
 - identify process streams, feedstocks, wastes and other substances handled or stored on-site that conceivably might leak or be accidentally released and which could pose risks to employee and/or public health and safety. Indicate their composition and the magnitude of stored amounts and throughput rates.

- identification of existing, and where possible, anticipated standards for those areas of environmental concern that are regulated, with a comparison between those standards and expected emissions.
 - description of mitigative measures employed in the project to reduce potential negative environmental effects.
 - where uncertainties exist about the performance of control and mitigative methods, describe alternative control and mitigative methods that are reasonably available in the event that the predicted effectiveness of proposed methods is not achieved.
- o A complete description of likely alternatives being considered for the project. These alternatives might include such aspects as process design configurations (e.g., coal delivery by barge vs. rail, or hot gas vs. cold gas cleanup, etc.), and site specific considerations such as alternative waste disposal sites, etc. Discussions should not include alternative sites or technologies which may have been considered, but subsequently rejected, while preparing the proposal.

EXISTING ENVIRONMENT

This section provides a description of the environmental setting of the proposed project. It is expected that proposers will use the most recent existing data sources (i.e., Census, EPA and USGS for ambient air and surface water monitoring, and appropriate state and federal agencies and publications, etc.). Data from these and other sources are generally readily available and can be easily accessed.

- o Description, using visuals as appropriate, of project site sufficient to identify all potential environmental impacts.
 - description of physical appearance,
 - description of existing landforms such as drainage areas, runoff areas, etc.,

- location and description of floodplains and wetlands, and
- description of existing offsite facilities such as pipelines and transmission lines, transportation access, water sources, etc.
- o Description of environmental setting including a description of the environmental conditions based on available or existing information prior to the proposed project. The description should provide sufficient information to permit independent evaluation by reviewers of factors that are likely to be affected by the proposed project, and should include photographs or illustrations to provide the reviewers with visual orientation to the existing environment. USGS maps may also be useful to relate the conditions described to specific areas.

The following environmental factors may be applicable if the "Consequences of Project" section below indicates a potential significant change from existing conditions. If sampling data are used to describe the environmental conditions, the relationship of the sampling point to the proposed facility should be shown.

- atmospheric conditions, including downwind conditions; identification of affected air quality control region(s); local climate conditions; existing ambient air quality; conditions/features downwind that may be impacted.
- hydrologic conditions, including identification of watershed and downstream drainage; surface and groundwater quality to be impacted; conditions downstream or within drainage areas including floodplains; unique aquatic habitats; water recreation areas and public water supplies; hydrologic hazards such as flood or storm runoff.
- geologic conditions including erosion potential; seismic hazards; topographic stability and features; description of formations and faulting; productivity of soil; soil species.

- ecological conditions including state and federally listed endangered species; and their habitats; major flora, fauna, and wildlife; unique ecological or sensitive communities or habitats, such as wetlands and/or floodplains.
- socioeconomic conditions including population, migrational trends, employment and labor mix, available public services.
- aesthetic conditions including scenic vistas, historic/archaeological sites, cultural values.
- Native American tribal or other religious practices at or near the proposed project.
- identification of any other energy or chemical complexes existing or planned sufficiently close to the site to cumulatively impact environmental, health, safety, or socioeconomic factors.

CONSEQUENCES OF THE PROJECT

This section should contain the following information concerning impacts and consequences of the project (at selected site and the alternative sites, if appropriate). Plans for mitigating such impacts should be included. This section should also include a summary and ranking of all expected consequences in the approximate order of decreasing risk to project implementation. The ranking within each subsection should be based on consideration of items such as: a) nature and magnitude of impact; b) uncertainty in the effectiveness of proposed environmental controls; c) lack of definitive data on plant emissions and waste streams; and, d) uncertainties in anticipated regulations.

Detail of subsequent discussion should be commensurate with expected impacts.

Consequences of Construction

- o Overall description of construction activities, including disruption, duration, schedule, etc.
- o Environmental, health, and safety impacts, including:
 - atmospheric impacts, including projection of air quality changes;
 - hydrologic impacts, including changes in groundwater/surface water quality and quantity, and stream diversion;
 - land use impacts during and after construction activities;
 - public and occupational health consequences of construction activities, including accidents; and
 - ecological impacts, including any construction proposed in wetlands, floodplains, or other ecologically sensitive terrain.
- o Socioeconomic impacts.

Consequences of Operation and Disposition

- o Environmental, health, and safety impacts as a result of project operation and disposition including mitigative measures, and an indication whether impacts from other "nearby" planned energy or chemical complexes are expected to occur. Describe the measures, if any, planned for mitigation of cumulative impacts. Indicate what type of follow-up data collection, monitoring and response procedures will be followed to detect impacts, confirm the performance of mitigating measures, and respond to potential problems.
 - Atmospheric impacts, including projection of air quality changes (give indication of atmospheric models used, if used in projection).

- Hydrologic impacts, including changes in groundwater/surface water quality and quantity, from runoff from storage piles, leachates from waste disposal sites and wastewater cleaning and discharges.
- Land use impacts resulting from solid waste disposal (including toxic and hazardous substances) or other discharges.
- Geologic impacts, including subsidence, seismicity, erosion, stream diversion, flood plain and wetlands intrusion, soil permeability and infiltration, integrity of solid waste disposal sites, etc.
- Public and occupational health and safety impacts, including exposure to toxic and hazardous substances, noise, odor, and potential accidents.
- Ecological impacts.
- Impact on regional or local plans for fuel, water resources, solid waste, land, air quality and labor force.
- Irreversible/irretrievable commitment of resources and opportunities to reuse and recycle resources (wastes, water).
- Socioeconomic impacts.
- Aesthetic impacts, including visual impacts.
- Impact on Native American tribal or other religious practices and sites; and potential impact on community character.

Impacts of Alternatives to the Project

Environmental, health, and safety impacts of likely alternatives being considered for the project. These alternatives might include such aspects as process design configurations (e.g., coal delivery by barge vs. rail, or hot gas vs. cold gas cleanup, etc.), and site specific considerations such as

alternative waste disposal sites, etc. The alternatives and their projected impacts should be discussed in relation to a no-action alternative at the site. Discussions should not include alternative sites or technologies which may have been considered, but subsequently rejected, while preparing the proposal.

REGULATORY COMPLIANCE

This section should identify all of the environmental laws and regulations (federal, state, and local) for which compliance will be necessary prior to implementation of the project. The participant should discuss the following:

- o Preliminary description of best available control technology and feasible practices that would be employed to obtain compliance with identified environmental and occupational requirements.
- o Any nonattainment areas and the substances involved
- o Preliminary assessment of environmental monitoring requirements, and tentative schedule to file for and obtain all permits.
- o Lowest available emission requirements; if applicable.

INFORMATION NECESSARY FOR EVALUATING IMPACTS TO WATER RESOURCES

Previously, the Water Resources Council developed assessments of water resource requirements and water supply availability for any non-nuclear energy technology research and development project under the Federal Non-nuclear Energy Research and Development Act. Since the Water Resource Council is no longer a functioning body of the Federal Government, water assessments are no longer required. However, because the Clean Coal Technology Program may result in projects for which water resource requirements and water availability may be important issues, the following information should be included in the NEPA documentation prepared for those projects to the extent applicable:

1. Provide data on water supply and demand within the geographical area of the proposed project;

2. Discuss any constraints upon water availability imposed by treaties, compacts, court decree, state water laws, and water rights granted pursuant to state and federal law;
3. Assess the effects of the project on regional water quantity and quality;
4. Estimate the costs associated with production and management of the required water supply, and the cost of disposal of waste water generated by the proposed project; and,
5. Assess the environmental, social, and economic impact of any change in use of currently utilized water resources that may be required by the proposed project.

If water resource requirements and water availability are not significant issues, information should be included in the NEPA documentation to substantiate this fact.

APPENDIX K

COST ESTIMATE AND FINANCING EXHIBITS

NOTE: The attached exhibit forms are provided as a convenience to the proposer to show the required information. The proposer may, however, provide a facsimile with the required information.

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EXHIBIT A

PROJECT COST SUMMARY

The attached form for Exhibit A should be used to provide the required Project Cost Summary information. This exhibit uses the WBS developed for the technical proposal as a basis for development of the project cost estimate. Each Phase should be prepared separately to WBS level 3, i.e. the task level. All proposed preaward costs should be identified separately. These preaward costs will be cost shared at the overall total project cost ratio at the time the Cooperative Agreement is signed. For this cost estimate the task amounts for Phases I, II, and III should total the Project Cost. If the proposer is proposing a project definition period, then Phase I should identify the project definition tasks. The Phase and Project totals from this Exhibit should equal the Phase and Project totals shown in Exhibits B and D.

The following outline is provided as an example to be used to identify the task numbers:

- TOTAL ESTIMATED COST (Sum of Preaward & Phases I, II, III)
- PREAWARD COST
 - P.1 Preaward Task 1 Cost
 - P.2 Preaward Task 2 Cost
- 1.0 TOTAL PROJECT COST (To complete Statement of Work)
 - 1.1 PHASE I COST
 - 1.1.1 Project Definition Cost
 - 1.1.1.1 Task 1 Cost
 - 1.1.1.2 Task 2 Cost
 - 1.1.2 Remaining Phase I Costs
 - 1.1.2.1 Task 1 Cost
 - 1.1.2.2 Task 2 Cost
 - etc.
 - 1.2 PHASE II COST
 - 1.2.1 Task 1 Cost
 - 1.2.2 Task 2 Cost
 - etc.

For this summary, the task amounts should total the Phase amounts and the Phase amounts should total the Project Cost. List all of the tasks and then the summary totals for each category on the attached Exhibit form.

BUDGET PERIOD

All tasks that will be performed in the first Budget Period should be annotated. As a minimum, the preaward and project definition period tasks must be in the first Budget Period. The first Budget Period total amount should be the sum of the specified tasks. This total should be the same as the amount identified in Exhibit D.1, Summary Financing Plan By Phase. This is important to the comprehensive evaluation of the finance criteria. The remaining tasks do not have to be identified to a particular Budget Period, since the rest of the Budget Periods may be determined after selection.

TASK

Identify the WBS task number and provide a short description of the task. The proposed cost of each task should be broken down by the proposer's fiscal year in order to provide the base cost and escalation cost. The WBS task total by year should be the same as the totals shown in Exhibit B.1, Summary of Cost Elements By Task By Year. Detailed escalation information is not required to be submitted for proposal purposes but should be made available as required for review after selection.

PHASE

The total amount of tasks in each category (preaward or Phase) should be summarized at the bottom of the form. The total proposed cost for each category should equal the respective totals in Exhibits B, D, and D.1.

PROJECT COST SUMMARY

PAGE ___ **of** ___

DATE: _____

[illegible]

1	TOTAL OF FIRST BUDGET PERIOD		
---	------------------------------	--	--

* THE FIRST BUDGET PERIOD TASKS MUST BE IDENTIFIED.

** ENTER YEAR FOR BASE COST

EXHIBITS B AND B.1

SUMMARY OF COST ELEMENTS BY PHASE and SUMMARY OF COST ELEMENTS BY TASK BY YEAR

The attached forms for Exhibits B and B.1 should be used to provide the required Summary of Cost Elements information by Phase and by WBS task by year respectively. This information should be provided by the Proposer. If the total cost for subcontracts and/or consultants exceeds 20% of the proposed total estimated cost, then the same information should be provided for each subcontractor and/or consultant. This information may be based on estimates made by the proposer in the event that the subcontractor and/or consultant has not yet been identified. The Major Equipment total should equal the amount shown in Exhibit C, Major Equipment List. The total of the In-Kind Contributions should agree with the total in Exhibit E, Summary of In-Kind Contributions By Phase and Year.

PHASE

The summary of cost elements by Phase should be provided in Exhibit B. This represents a summary of the task level detail provided in Exhibit B.1. In-Kind Contributions of costs which are not clearly identifiable to a specific task may be summarized at the preaward and Phase level without prorating to the task level. Detailed information of the In-Kind Contributions is to be provided in Exhibit E.

WBS TASK

Develop the estimated cost by cost element detail for each fiscal year covered by the WBS task and provide the total by cost element for each WBS task. The cost element detail includes material, labor hours, labor rates, overheads, other direct costs, etc. All tasks that will be performed in the first Budget Period should be annotated. The total by WBS task by fiscal year should agree with Exhibit A.

EXHIBIT B SUMMARY OF COST ELEMENTS BY PHASE

PROPOSER/SUBCONTRACTOR:

PROJECT TITLE:

PAGE ____ OF ____
DATE: ____

IDENTIFY THE FIRST BUDGET PERIOD		1ST PREAWARD EST. COST	1ST PHASE I EST. COST	PHASE II EST. COST	PHASE III EST. COST	TOTAL EST. COST
COST ELEMENT						
A) MAJOR EQUIPMENT (Exhibit C)						
B) BULK PURCHASES						
C) OTHER						
TOTAL DIRECT MATERIAL		\$	\$	\$	\$	\$
MATERIAL OVERHEAD						
DIRECT LABOR - HOURS		Hrs	Hrs	Hrs	Hrs	Hrs
DIRECT LABOR - COST						
LABOR OVERHEAD						
SPECIAL TESTING/EQUIPMENT						
SUBCONTRACTS						
CONSULTANTS						
TRAVEL						
OTHER DIRECT COSTS						
TOTAL DIRECT COSTS & OVERHEAD (ITEMS 1 THROUGH 9)		\$	\$	\$	\$	\$
G&A						
TOTAL ESTIMATED COST EXCLUDING IN-KIND CONTRIBUTIONS (Items 10 & 11)		\$	\$	\$	\$	\$
IN-KIND CONTRIBUTIONS (Exhibit E)						
TOTAL PROPOSED BASE COST (Items 12 & 13)		\$	\$	\$	\$	\$
ESCALATION						
TOTAL PROPOSED COST (Items 14 & 15)		\$	\$	\$	\$	\$

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

EXHIBIT B.1

SUMMARY OF COST ELEMENTS BY TASK AND YEAR

PROPOSER/SUBCONTRACTOR: _____

PAGE ____ OF ____

TASK TITLE: _____

FIRST BUDGET PERIOD? _____

DATE: _____

PHASE:		TASK NUMBER:	ESTIMATED COST			
COST ELEMENT			YEAR:	YEAR:	YEAR:	TOTAL
MATERIAL: A) MAJOR EQUIPMENT (Exhibit C)						
B) BULK PURCHASES						
C) OTHER						
1.	TOTAL DIRECT MATERIAL	\$	\$	\$	\$	\$
2.	MATERIAL OVERHEAD % RATE					
3.	DIRECT LABOR - HOURS	Hrs	Hrs	Hrs	Hrs	Hrs
	DIRECT LABOR - COST					
4.	LABOR OVERHEAD % RATE _____ BASE					
5.	SPECIAL TESTING / EQUIPMENT					
6.	SUBCONTRACTS					
7.	CONSULTANTS					
8.	TRAVEL					
9.	OTHER DIRECT COSTS					
10.	TOTAL DIRECT COSTS & OVERHEAD (ITEMS 1 THROUGH 9)	\$	\$	\$	\$	\$
11.	G&A % RATE _____ BASE					
12.	TOTAL ESTIMATED COST EXCLUDING IN-KIND CONTRIBUTIONS (Items 10 & 11)	\$	\$	\$	\$	\$
13.	IN-KIND CONTRIBUTIONS (Details in Exhibit E)					
14.	TOTAL PROPOSED BASE COST (Items 12 & 13)	\$	\$	\$	\$	\$
15.	ESCALATION % RATE					
16.	TOTAL PROPOSED COST (Items 14 & 15)	\$	\$	\$	\$	\$

EXHIBITS C AND C.1

MAJOR EQUIPMENT CHARACTERISTICS LIST
and
MAJOR EQUIPMENT LIST

Major equipment items should have been identified in the flowsheet that appears in Proposal Section II.B; see Instruction 5.3.2. These exhibits should detail characteristics and costs of major equipment items using the attached forms for Exhibits C and C.1. All major equipment items that are being proposed in the first Budget Period should be so designated. The total equipment cost should be the same as the total Major Equipment in Exhibit B while the equipment costs for each task should equal the task total for Major Equipment as identified in Exhibit B.1.

In Exhibit C.1, the installed cost for the equipment should be the cost associated with installation only and should not include the cost of the equipment that is installed nor the freight charges. The total cost per unit of equipment item should be the sum of the equipment cost, the sales tax, the freight charges, and the installation cost. Total cost would then depend on the quantity of equipment item units.

PROPOSER/SUBCONTRACTOR: _____

PROJECT TITLE: _____

PAGE ____ OF ____

DATE: _____

[illegible]

• MAJOR EQUIPMENT IN THE FIRST BUDGET PERIOD MUST BE IDENTIFIED.

PAGE ____ OF ____

DATE:

[illegible]

EXHIBITS D AND D.1

SUMMARY FINANCING PLAN and SUMMARY FINANCING PLAN BY PHASE

The attached forms for Exhibits D and D.1 should be used to provide the summary and detailed information for financing the entire project. All financing required to cover costs to be incurred in the first Budget Period should be designated. This is important to the comprehensive evaluation of the finance criteria. Failure to identify the first Budget Period financing may cause a deficiency serious enough to fail the comprehensive evaluation. The cost share dollars and percentages shown in Exhibit D should be the same as in the Authorization Certification or SF 424 required by Appendix G. In-Kind Contributions should be detailed in Exhibit E, Summary of In-Kind Contributions by Phase and Year, and the totals should match those shown in Exhibit B, Summary of Cost Elements by Phase.

The following should be used for the **ROLE OF CONTRIBUTOR:**

- P** = Proposer
- S** = Sponsor - Include industry-funded research organizations and state/local governments.
- PR** = Partner
- SC** = Subcontractor - Include any team member who will be a subcontractor.
- O** = Other Team Member - Include team members who will not be subcontractors such as equipment vendors, host utilities, etc. The proposer should describe the role of each contributor in this category.

The following should be used for **CASH TYPE:**

- C** = Cash equity from internally generated funds.
- A** = Additional cash equity to be obtained (i.e. sale of stocks or bonds). Describe in an attachment to the Exhibit.
- D** = Debt - The proposer should identify source (bank, insurance company, vendor, etc.), type of debt (non-recourse or recourse), and proposer's assumptions regarding interest rate and annual debt service for each source of anticipated debt financing.
- G** = Grant from industry-funded research organizations and state/local governments.
- P** = Program revenues shown in Phase III must meet PON criteria and be fully supported in Exhibit F.
- O** = Other. The proposer should describe any cash type(s) in this category.

Additional narrative information should be attached to the Exhibit D.1, as required.

EXHIBIT D SUMMARY FINANCING PLAN

PROPOSER: _____ PAGE ____ OF ____

PROJECT TITLE: _____ DATE: _____

DOLLARS	PREAWARD	STATEMENT OF WORK			TOTAL PROJECT	TOTAL FINANCING
		PHASE I	PHASE II	PHASE III		
CASH CONTRIBUTIONS	\$	\$	\$	\$	\$	\$
IN-KIND CONTRIBUTIONS						
TOTAL NON-DOE COST SHARE	\$	\$	\$	\$	\$	\$
U.S. DOE						
TOTAL	\$	\$	\$	\$	\$	\$

PERCENTAGE	PREAWARD	STATEMENT OF WORK			TOTAL PROJECT	TOTAL EST. COSTS
		PHASE I	PHASE II	PHASE III		
CASH CONTRIBUTIONS	%	%	%	%	%	%
IN-KIND CONTRIBUTIONS	%	%	%	%	%	%
TOTAL NON-DOE COST SHARE	%	%	%	%	%	%
U.S. DOE	%	%	%	%	%	%
TOTAL	%	%	%	%	%	%

- * TOTAL PROJECT SHOULD EQUAL THE STATEMENT OF WORK (PHASES I THROUGH III).
- ** TOTAL FINANCING SHOULD REPRESENT TOTAL ESTIMATED COSTS WHICH EQUALS PREAWARD AND PROJECT COSTS.
- *** THE PREAWARD COST SHARE MUST EQUAL THE PERCENTAGE OF THE TOTAL PROJECT (PHASES I - III).

DATE: _____

PROPOSER:

PROJECT TITLE:

[illegible]

• C/I - IDENTIFY EACH CONTRIBUTION AS CASH OR IN KIND

EXHIBIT E

SUMMARY OF IN-KIND CONTRIBUTIONS BY PHASE AND YEAR

The proposer is to provide the following information for all In-Kind Contributions proposed for each project Phase. The attached form for Exhibit E should be used with a narrative attachment, as required, to fully identify and support the proposed In-Kind Contributions. The information must be verifiable to the Proposer's records. Provide the information requested which is appropriate for the type of In-Kind Contribution being proposed.

SOURCE OF IN-KIND CONTRIBUTION

The name and role of the contributor as shown in Exhibit D.1.

DESCRIPTION OF IN-KIND CONTRIBUTION

The type of In-Kind Contribution, such as property, equipment, land, etc., and a brief description of the expected use.

AVAILABILITY/AMOUNT OF USE

Provide the total amount of time the item is available for use and the estimated amount of time the item will be used on/for this project.

UNIT VALUE

Provide the unit value and the quantity, as appropriate.

PHASE

Phase I, II, or III

BUDGET PERIOD

Designate any contribution being made in the first Budget Period.

PROPOSED VALUE (by Total and by Year)

State the estimated value. The estimated value will be developed following the procedures in OMB Circular 102, Attachment F, Paragraph 5 for state or local government participants, or OMB Circular A-110, Attachment E, Paragraph 5 for all other participants.

The following information should be provided in an attachment to the form for Exhibit E, as necessary.

DATE OF ACQUISITION AND ACQUISITION COST

Date when the item was originally purchased and original acquisition cost. Provide documentation to support original acquisition cost stated.

DEPRECIATION STATUS

State if the item is fully depreciated or is currently being depreciated. For fully depreciated equipment or facilities provide evidence to show that it was continuously used during the entire Calendar Year 1990.

DEPRECIATION AMOUNT

Provide the yearly depreciation schedule and the years during which the depreciation took/takes place.

EXHIBIT E

SUMMARY OF IN-KIND CONTRIBUTIONS BY PHASE AND YEAR

PROPOSER: _____

PROJECT TITLE: _____

PAGE ____ OF ____

DATE: _____

[illegible]

* CONTRIBUTIONS IN THE FIRST BUDGET PERIOD MUST BE IDENTIFIED.

EXHIBIT F

PRO FORMA INCOME STATEMENTS FOR PHASE III

This Exhibit is required only if Program Revenue is proposed as a source of funding for the project (refer to Exhibit D).

Pro forma income statements should be provided by quarter for the entire period of operation of the Demonstration Project. These statements should include the following information:

1. Itemization of the sources of Program Income, quantities of products and byproducts, unit prices and any fees for services;
2. Itemization of the project-specific variable operating costs, quantities, unit costs, labor requirements and rates;
3. Itemization of project-specific fixed charges, quantities, unit costs, labor requirements and rates;
4. Provide all assumptions that support the pro forma statements, e.g. stream factor and capacity factor per quarter and the technical rationale that supports these projections, escalation factors, ratios for overhead, maintenance, etc.
5. Identify any one-time or infrequent costs that will be incurred during Phase III, e.g. the additional costs of start-up, turnarounds or replacement of equipment, etc.

Total variable operating costs and fixed operating and maintenance costs for all quarters should agree with the corresponding total costs shown in Exhibit G.

EXHIBIT G

SUMMARY OF OPERATING AND STARTUP COSTS

The attached form for Exhibit G should be used to provide the required information concerning total project operating and startup costs. A narrative may be included as an attachment to the form.

FIXED OPERATING AND MAINTENANCE COSTS

Operating labor costs should be broken down into the number of operators per shift, total operating hours, and the average operating labor pay rate per hour as indicated. Then the total operating labor costs should be calculated and given. Also, total maintenance labor costs, maintenance material costs, and administrative and support labor costs should be provided. The total fixed operating and maintenance costs should be calculated and given as indicated.

VARIABLE OPERATING COSTS

Variable operating costs should be given for all commodities used. The commodities include such items as fuels, sorbents/chemicals, raw water, cooling tower blowdown water, steam, auxiliary power, waste effluents, by-product credits and fuel credits. For each commodity, the data should be broken down into \$/unit, quantity/hr, cost \$/hr, total hours, total cost. Total cost for all commodities should be given on the last line.

STARTUP COSTS

The months required for startup and the total costs associated with start-up should be given. Startup costs refer to those additional costs incident to startup, and not to normal project costs during the startup period.

EXHIBIT G

SUMMARY OF OPERATING AND STARTUP COSTS

PROPOSER _____
 PROJECT TITLE _____

FIXED OPERATING AND MAINTENANCE COSTS	
1. Operating Labor Costs	
Number of Operators per Shift	_____
Total Operating Hours	_____
Operating Labor Pay Rate per Hour	_____
Total Operating Labor Costs	_____
2. Total Maintenance Labor Costs	
3. Total Maintenance Material Costs	
4. Total Administrative and Support Labor Costs	
5. Total Fixed O&M Costs	

VARIABLE OPERATING COSTS					
Commodities	\$/Unit	Quantity/Hr	Cost \$/Hr	Total Hours	Total Cost
Total	-----	-----	-----	-----	-----

STARTUP COSTS	
Months	_____
Total Costs	_____

APPENDIX L

MODEL COOPERATIVE AGREEMENT

U.S. DEPARTMENT OF ENERGY
NOTICE OF FINANCIAL ASSISTANCE AWARD
(See Instructions on Reverse)

Under the authority of Public Law _____ and
subject to legislation, regulations and policies applicable to (cite legislative program title): _____

PROJECT TITLE		2. INSTRUMENT TYPE <input type="checkbox"/> GRANT <input type="checkbox"/> COOPERATIVE AGREEMENT	
3. RECIPIENT (Name, address, zip code, area code and telephone no.)		4. INSTRUMENT NO.	5. AMENDMENT NO.
8. RECIPIENT PROJECT DIRECTOR (Name and telephone No.)		6. BUDGET PERIOD FROM: THRU:	7. PROJECT PERIOD FROM: THRU:
9. RECIPIENT BUSINESS OFFICER (Name and telephone No.)		10. TYPE OF AWARD <input type="checkbox"/> NEW <input type="checkbox"/> CONTINUATION <input type="checkbox"/> RENEWAL <input type="checkbox"/> REVISION <input type="checkbox"/> SUPPLEMENT	
11. DOE PROJECT OFFICER (Name, address, zip code, telephone No.)		12. ADMINISTERED FOR DOE BY (Name, address, zip code, telephone No.)	

13. RECIPIENT TYPE			
<input type="checkbox"/> STATE GOV'T	<input type="checkbox"/> INDIAN TRIBAL GOV'T	<input type="checkbox"/> HOSPITAL	<input type="checkbox"/> FOR PROFIT ORGANIZATION
<input type="checkbox"/> LOCAL GOV'T	<input type="checkbox"/> INSTITUTION OF HIGHER EDUCATION	<input type="checkbox"/> OTHER NONPROFIT ORGANIZATION	<input type="checkbox"/> INDIVIDUAL
		<input type="checkbox"/> C <input type="checkbox"/> P <input type="checkbox"/> SP	<input type="checkbox"/> OTHER (Specify)
14. ACCOUNTING AND APPROPRIATIONS DATA			15. EMPLOYER I.D. NUMBER/SSN
a. Appropriation Symbol	b. B & R Number	c. FT/AFP/OC	
		d. CFA Number	

16. BUDGET AND FUNDING INFORMATION	
a. CURRENT BUDGET PERIOD INFORMATION	b. CUMULATIVE DOE OBLIGATIONS
(1) DOE Funds Obligated This Action \$ _____	(1) This Budget Period \$ _____ [Total of lines a. (1) and a. (3)]
(2) DOE Funds Authorized for Carry Over \$ _____	(2) Prior Budget Periods \$ _____
(3) DOE Funds Previously Obligated in this Budget Period \$ _____	(3) Project Period to Date \$ _____ [Total of lines b. (1) and b. (2)]
(4) DOE Share of Total Approved Budget \$ _____	
(5) Recipient Share of Total Approved Budget \$ _____	
(6) Total Approved Budget \$ _____	

17. TOTAL ESTIMATED COST OF PROJECT \$ _____
(This is the current estimated cost of the project. It is not a promise to award nor an authorization to expend funds in this amount.)

18. AWARD/AGREEMENT TERMS AND CONDITIONS

This award/agreement consists of this form plus the following:

- a. Special terms and conditions (if grant) or schedule, general provisions, special provisions (if cooperative agreement)
- b. Applicable program regulations (specify) _____ (Date) _____
- c. DOE Assistance Regulations, 10 CFR Part 600, as amended, Subparts A and ☐ B (Grants) or ☐ C (Cooperative Agreements).
- d. Application/proposal dated _____, ☐ as submitted ☐ with changes as negotiated

19. REMARKS

20. EVIDENCE OF RECIPIENT ACCEPTANCE

(Signature of Authorized Recipient Official) (Date)

(Name)

(Title)

21. AWARDED BY

(Signature) (Date)

(Name)

(Title)

INSTRUCTIONS

(This form shall be completed in accordance with the following instructions. For any clarification or additional information that might be needed, consult the appropriate section of the DOE Financial Assistance Procedures Manual (DOE-FAPM).)

Insert in the space provided, in the line which begins, "Under the Authority of Public Law . . .," the number and the name of the Public Law which authorizes this award. On the line below, enter the title of the pertinent program.

Block 1 - Enter the project title as it appears in the SF-424 or equivalent application proposal face sheet.

Block 2 - Place a checkmark in the box beside the appropriate financial assistance instrument

Block 3 - Enter the name, address and telephone number of the applicant/proposer as it appears in the SF-424 or equivalent application/proposal face sheet.

Block 4 - Enter the instrument number. (See DOE-FAPM.)

Block 5 - Enter the appropriate amendment number. (See DOE-FAPM for guidance.)

Block 6 - Enter the starting date and expiration date for the current budget period. If a budget period is being changed, enter the starting date and expiration date for the budget period, as changed.

Block 7 - Enter the starting date and anticipated completion date for the project. If a project period is being changed, enter the starting date and anticipated completion date for the project period, as changed.

Block 8 - Enter the name and telephone number of the individual designated by the applicant/proposer as the director of the project.

Block 9 - Enter the name and telephone number of the individual designated by the applicant/proposer as the contact for all business matters.

Block 10 - Place a checkmark in the box opposite the term which identifies the type of action being taken. (The terms are defined in the DOE-FAPM.)

Block 11 - Enter the name, address and telephone number of the individual designated by the DOE program office as the project officer.

Block 12 - Enter the name, address and telephone number of the individual/organization who will administer the agreement for DOE.

Block 13 - Place a checkmark in the box beside the applicable recipient type. If the recipient is a for-profit organization also check one of the lower boxes as follows: "C" for Corporation, "P" for Partnership and "SP" for Sole Proprietorship. If the recipient is of a type not indicated place a checkmark in the box beside "Other," and identify the recipient type in the space provided.

Block 14 - Enter where indicated, the appropriation symbol, B&R number, Fund Type (FT)/AFP Code (AFP)/Objective Class (OC) and CFA Number from the Procurement/Financial Assistance Request Authorization (DOE Form PR-799A). Completion of Block 14 d. is required only for awards made by Headquarters.

Block 15 - Enter the applicant's/proposer's Federal Employer Identification No. from the SF-424 or equivalent application/proposal face sheet, or if the applicant/proposer is an individual, enter his/her social security number

Block 16 - Entries should be made as follows. (If no dollar entry is appropriate a zero should be entered to indicate there was no error of omission.)

Line a.(1) - Enter the amount of DOE funds obligated by this action.

Line a.(2) - Enter the amount of DOE funds not expended in prior budget period(s), if any, authorized by DOE for expenditure in the current budget period.

Line a.(3) - Enter the amount of DOE funds previously obligated in the current budget period.

Line a.(4) - Enter DOE's share of the total approved budget shown on Line a.(6).

Line a.(5) - Enter the recipient's share of the total approved budget shown on Line a.(6).

Line a.(6) - Enter the total approved budget for the current budget period. (Add the amounts in lines a.(4) and a.(5).)

Line b.(1) - Enter the amount of DOE funds obligated in the current budget period. (Add the amounts in lines a.(1) and a.(3).)

Line b.(2) - Enter the amount obligated by DOE in prior budget periods.

Line b.(3) - Enter the amount obligated by DOE in the project period to date. (Add the amounts in lines b.(1) and b.(2).)

Block 17 - Must be completed for cooperative agreements. Contracting Officers may exercise discretion as to whether to complete it for grants. Enter in the blank provided, the amount which represents the current estimate of total funds and dollar value of in-kind contributions (both DOE and recipient shares) needed to carry out the entire project. Include all funds and contributions previously provided, those being provided by this action, and all anticipated future obligations and contributions of both parties.

Block 18 - Complete as follows:

Item a. - No entry necessary.

Item b. - Enter the legal citation from the Code of Federal Regulations or Federal Register and the effective date for the program regulations applicable to the program under which the award is made.

Item c. - Mark the box beside B for grants or C for cooperative agreements.

Item d. - In the blank provided, enter the date of the application/proposal. (If SF-424 is used, see block 23c on page 1.) Place a checkmark in the appropriate box to indicate whether the application/proposal was accepted as submitted or with negotiated changes.

Block 19 - Enter any explanation or advisory comments which are required for, or applicable to, this action.

Block 20 - Will be completed by the recipient.

Block 21 - The Contracting Officer shall sign and date the top line. His/her name and title should be entered on the next two lines. This box must be signed prior to forwarding to recipient.

"Prior approval" means documentation signed by a DOE Contracting Officer evidencing consent to the incurrence of a specific cost before it is incurred. The procedures for requesting prior approval are set forth in 10 CFR § 600.114 (e) or 600.430(f).

"Project" means the set of activities described in Attachment A, Statement of Work, that the Participant is required to perform during Phases 1, 2, and 3 of this Cooperative Agreement.

"Program Income" means the gross income earned directly from any demonstration project activity supported with DOE funds during Phases 1, 2, and 3. Such income includes fees for services; fees or rental income for the use of real or personal property acquired with DOE funds; and income from the sale of fuel, byproducts, or energy generated by the demonstration project. Such income does not include interest on DOE funds; rebates, credits, discounts, refunds, etc. and any interest earned on any of the foregoing; or income from royalties and license fees.

"Pub. L. 101-121" means Title II of "an Act making appropriations for the Department of the Interior and related agencies for the fiscal year ending September 30, 1990, and for other purposes," specifically the provisions under the Department of Energy headings entitled, "Clean Coal Technology" (102 Stat. 1810-1811) and "Administrative Provisions, Department of Energy" (102 Stat. 1813-1814).

"Repayment Agreement" means the agreement made by the Participant in DOE Instrument Number _____ on _____, 1991, to repay the DOE share of costs paid under this Cooperative Agreement.

"Total Approved Budget" means the amount of costs authorized to be incurred during each budget period, as shown on the Notice of Financial Assistance Award, by the Participant and any of its contractors. The total approved budget consists of DOE funds for allowable direct and indirect costs and the Participant's required cost-sharing, and shall include the fair use value of in-kind contributions that will be made to carry out the project.

"United States" means the United States of America and its 50 states, the District of Columbia, the Commonwealth of Puerto Rico, and any possession or trust territory of the United States.

ARTICLE III. PROJECT MANAGEMENT

(A) Participant Role

The Participant shall be responsible for all aspects of project performance as set forth in the Statement of Work, Attachment A. All services, personnel, facilities, equipment, materials, and supplies shall be furnished by the Participant, unless otherwise specified under this Cooperative Agreement.

The Participant shall designate a Project Manager who shall serve as its authorized representative for the technical and administrative elements of all work to be performed under this Cooperative Agreement. The Project Manager shall be the single authorized point of contact for all communications between the Participant and DOE.

(B) DOE Role

DOE shall monitor the Participant's progress in performing the project, and shall, as indicated in this paragraph and in Article VIII, have a substantial role in project decision making. DOE also shall approve or disapprove all actions for which, by the terms of this Cooperative Agreement, the Participant is required to obtain DOE's approval.

(C) No Government Obligation to Third Parties

In connection with the performance of the Project, the Government shall have no obligation or responsibility to any contractor, subcontractor or other person who is not a party to this Cooperative Agreement. The foregoing limitation shall apply notwithstanding the Contracting Officer's prior approval or consent of any contract awarded by the Participant. The Participant shall be responsible, without recourse to DOE, for the resolution and satisfaction of all preaward protests, contract administration issues, and contract disputes arising out of acquisitions related to the Project.

(D) Participant's Project Management Structure/Procedures

The Participant shall manage the project in accordance with the Project Management Plan which, as indicated in the Statement of Work, shall be submitted to DOE for approval. *[INSERT material which is pertinent and specific to the project.]*

ARTICLE IV. DESIGNATION OF THE DOE CONTRACTING OFFICER'S REPRESENTATIVES

COTR: (see Block 11 of the Notice of Financial Assistance Award)

Contract Specialist: (see Block 12 of the Notice of Financial Assistance Award)

Patent Counsel:

The DOE Contracting Officer is the only Government representative authorized to accept the reports and other deliverables the Participant is required to provide under this Cooperative Agreement. The review and approval of such reports and other deliverables may be delegated to the Contracting Officer's authorized representatives.

The DOE Contracting Officer shall designate a COTR who shall have the authority to issue written Technical Advice which suggests redirecting the project work (e.g., by changing the emphasis among different tasks), or pursuing specific lines of inquiry likely to assist in accomplishing the Statement of Work. The COTR shall have the authority to approve or disapprove those technical reports, plans, and other technical information the Participant is required to submit to DOE for approval. The COTR is not authorized to issue and the Participant is not required to follow any Technical Advice which constitutes work

which is not within the scope of the Statement of Work; which in any manner causes an increase or decrease in the total estimated cost or in the time required for performance of the project; which has the effect of changing any of the terms or conditions of the Cooperative Agreement; or which interferes with the Participant's right to perform the project in accordance with the terms and conditions of this Cooperative Agreement.

ARTICLE V. KEY PERSONNEL

The personnel specified in this clause are considered to be essential to the project. Before permitting the Project Manager to be absent for more than three months and before diverting any key person to other work, the Participant shall notify the Contracting Officer reasonably in advance and shall submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on the project. No key person may be substituted without the Contracting Officer's approval. Such approval shall be obtained in advance of the substitution, except that the Contracting Officer may ratify a substitution which, because of exigent circumstances, was made before the Participant could request and/or obtain the Contracting Officer's approval.

<u>Name</u>	<u>Title</u>
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____

ARTICLE VI. PROJECT SITE AND ACCESS

The project shall be performed principally at the following site(s): *[identify location/address of project site]*. At the request of the DOE Contracting Officer or the COTR, the Participant shall provide Government officials and interested members of the public as determined by DOE with access to the project site(s) to observe project operations at reasonable times and with reasonable limitations on the numbers of people during each visit.

ARTICLE VII. PROJECT PHASES AND ESTIMATED PROJECT COSTS

(A) Project Phases

The project period of this Cooperative Agreement is divided into three project phases (Design, Construction, and Operation) and *[INSERT NUMBER]* budget periods. *[The expected duration of each project phase and budget period will be established during negotiations.]*

(B) Total Estimated Project Costs

DOE and the Participant shall share in allowable direct and indirect project costs in the percentages up to the amounts shown below:

TOTAL ESTIMATED PROJECT COST	\$	_____		
<u>Pre-award</u>	*	DOE share	\$	_____ # %
		Participant share	\$	_____ %
<u>Phase 1</u>		DOE share	\$	_____ %
		Participant share	\$	_____ %
<u>Phase 2</u>		DOE share	\$	_____ %
		Participant share	\$	_____ %

<u>Phase 3</u>	DOE share	\$ _____	_____ %
	Participant share	\$ _____	_____ %
<u>Total</u>	DOE share	\$ _____	_____ # %
	Participant share	\$ _____	_____ %

* Actual allowable incurred costs which shall be reimbursed as provided in Article XI of this Cooperative Agreement. [*The numbers inserted at # shall be identical.*]

ARTICLE VIII. PROJECT DECISION MAKING

(A) Project Evaluation.

Shortly after the beginning of each budget period except for the last one, the Participant shall submit a Project Evaluation Plan (Plan) for DOE review and approval. The Plan must identify and describe the criteria by which the technical and economic feasibility of the project, based on the Participant's accomplishments during the budget period, are to be evaluated.

The DOE-approved Plan shall be used by the Participant to prepare a Project Evaluation Report which shall be submitted no later than 60 days before the end of the budget period. DOE shall use the approved Plan in evaluating the Participant's Evaluation Report and in deciding whether any accompanying continuation application will be approved.

(B) Continuation Applications.

If the Participant wishes to continue the Project beyond the current budget period, the Participant shall submit, no later than 60 days before the end of the current budget period, a continuation application which contains the following:

- 1) The Project Evaluation Report which shall describe in detail the status of the project and the technical progress made during the budget period.

- 2) A detailed description of the Participant's plan for conducting the project during the next budget period.
- 3) A detailed budget by project phase for the next budget period, including the proposed value of each in-kind contribution and an estimate of unobligated balances (see Article XII (A)).

(C) Approval/Disapproval of Continuation Applications

DOE shall approve or disapprove a timely continuation application no later than 30 days before the expiration of the current budget period. DOE will approve the continuation application provided the criteria in the approved Project Evaluation Plan are met and appropriated funds are available for the Project. In determining whether the criteria have been met, DOE will consider the Participant's Project Evaluation Report and other related information. DOE shall disapprove a continuation application if appropriated funds are unavailable or insufficient.

(D) Limitation of Cost Liability

If the Participant does not submit a continuation application (i.e., withdraws from the project) or if DOE does not make a continuation award, the liability of DOE shall be limited to its share of allowable costs incurred during the current and any previous budget period.

ARTICLE IX. PROJECT DEFINITION

Before the end of the first budget period, the Participant shall complete the project definition activities identified in the Statement of Work [as appropriate]. The Project Evaluation Report for this first budget period shall contain: an updated Project Management Plan; the Technology, Schedule, and Cost Baselines for all future project work, by phase, to be performed during each subsequent budget period; and all information requested by DOE to satisfy its

obligations under NEPA. Before approval of the first Continuation Application, the Participant shall deliver to DOE the signed commitments/ agreements for any financing required to meet the Participant's total cost-sharing obligation under this Cooperative Agreement.

ARTICLE X. DOE FINANCIAL SUPPORT AND LIMITATIONS ON DOE FUNDING

(A) DOE Obligation

The maximum DOE obligation to the Participant is the amount identified in Block 16.b(3) of the Notice of Financial Assistance Award. DOE shall not be obligated to make any additional, supplemental, continuation, renewal, or other award for the same or any other purpose.

(B) Unallowable Project Costs For Cost Sharing

- (1) DOE shall not accept valuation for property sold, transferred, exchanged, or manipulated in any way to acquire a new basis for depreciation purposes or to establish a rental value in circumstances which would amount to a transaction for the mere purpose of responding to this PON.
- (2) DOE will not cost share in both the direct cost and depreciation on the same item. Depreciation is not allowable for cost sharing on any item previously charged to the project as a direct cost. For example, DOE will cost share the direct cost on equipment or facilities purchased or constructed for the project and charged as a direct cost to the project but will not also cost share in the depreciation.
- (3) Interest on borrowings (however represented) and other financial costs such as bond discounts, costs of financing and refinancing capital (net worth plus long-term liabilities), are unallowable project costs and will not be cost shared. This includes interest on funds borrowed for construction.
- (4) Facilities capital cost of money shall be an unallowable cost on all real property or equipment acquired by or on behalf of the Participant in connection with the performance of the project.

- (5) Existing facilities, equipment, and supplies, or previously expended research or development funds are not cost sharing for the purposes of this PON, except as amortized, depreciated, or expensed in normal business practice.
- (6) Fully depreciated property will not receive any cost sharing value unless it has been in continuous use by the proposer during the entire calendar year 1990.
- (7) Foregone fees, profits, or revenues as well as replacement power costs are not allowable costs. Such costs shall not, therefore, qualify as cost sharing, nor will DOE pay any portion of such costs.
- (8) Fee or profit will not be paid to any member of the proposing team having a substantial and direct interest in the project. Competitive subcontracts placed with the prior written consent of the contracting officer and subcontracts for routine supplies and services are not covered by this prohibition.
- (9) Patents, proprietary data, or prior work will not be valued in determining the Participant's cost share in the project.
- (10) Allowable costs under past, present or future Government contracts, agreements or grants may not be charged against this Cooperative Agreement. Likewise, the Participant may not charge allowable costs of this project, including its share of cost participation, to the Federal Government under other contracts, agreements, or grants.

(C) Allowable Project Costs For Cost Sharing

DOE shall share in allowable project costs in the percentages indicated in Article VII. The allowability of direct and indirect costs incurred in the performance of the project shall be determined in accordance with the cost principles set forth in _____ [*Insert reference to appropriate cost principles; refer to list in 10 CFR § 600.103 (b) and § 600.442.*] and the following:

- (1) If the current cost of operation at an existing facility, such as coal, labor or other costs is increased as a direct result of the proposed project, only the incremental increase of such costs will be allowable during the course of the project.
- (2) The cost or value of new or existing equipment or facilities proposed for the project will be prorated for the purposes of cost sharing unless the item is dedicated only to the Demonstration Project and the size is not greater than that necessary for the demonstration (see Section 5.3.3.3).

- (3) The value that will be allowed for contributions of currently depreciating property, which are of relevance to the proposed project, is the depreciation schedule being used and allowed under statute or IRS regulations for such property. This depreciation will be limited in its cost share value to the depreciation claimed during the life of the Demonstration Project.
 - (4) For fully depreciated property contributed to the project and in continuous use during the entire calendar year 1990, a fair use value for the life of the project will be assigned by DOE. The fair use value will be the annual average depreciation used by the proposer as permitted under statute or IRS regulations under which it was depreciated. For contributions of property by tax exempt organizations, a fair use value will be assigned to the property equivalent to the value that would be assigned were the owner not tax exempt.
 - (5) Contributed land will be valued at its fair rental value for the period of the demonstration.
 - (6) Contributed land, equipment and facilities will be counted as cost sharing only for the periods during which they are brought into use for this project. For example, that portion of a facility used for housing the design team may be credited as a cost share during Phase I, but contributed equipment incorporated in the construction may be credited as a cost share only during those portions of Phases II and III when used. Property owned by one of the project team members and made available to the project will be valued according to the principles described above.
 - (7) Value for contributed equipment and facilities will be assigned only to the extent that the facility or equipment is project-related.
 - (8) The cost of disposal of the equipment and facility is an allowable cost if proposed and if accomplished during Phase III of the Cooperative Agreement.
- (D) Program Income
- (1) Use of Program Income. Notwithstanding 10 CFR § 600.113, program income may be used for any purpose.

ARTICLE XI. ALLOWABLE PREAWARD COSTS

The Participant shall be entitled to reimbursement of a portion of certain preaward costs it incurred after selection provided such costs are related to (1) the preparation of material requested by DOE and identified as required for negotiations, (2) the preparation and submission of environmental data requested by the DOE to complete NEPA requirements for the project.

ARTICLE XII. BUDGET ADJUSTMENTS

(A) Unobligated Balances

As used in this paragraph, "unobligated balance" means the portion of DOE funds that has not been obligated by the Participant, and is determined by subtracting the DOE share of the cumulative costs incurred from the amount of DOE funds authorized for expenditure. When the Participant has unobligated balances of funds remaining at the end of any budget period except for the last one, such funds may be used in the subsequent budget period and shall be specified and included in the total approved budget shown in an amended Notice of Financial Assistance Award. Whenever it becomes apparent during the penultimate budget period, that the amount of DOE funding authorized is expected to exceed the Participant's needs by more than five percent of DOE's share of total allowable costs, the Participant must notify DOE. DOE may reduce the award by an amount which does not exceed the total amount of excess funds.

(B) Budget Revisions

The Participant may rebudget funds within a total approved budget, subject to the prior approval requirements of 10 CFR § 600.114(b) and (e) or § 600.430(b) and (f). The Participant shall obtain prior written approval of the DOE Contracting Officer of any budget revision which would result in the need for additional DOE funding.

(C) Additional Funds

The Participant shall immediately notify the DOE Contracting Officer in writing whenever it becomes apparent that the costs of completing that portion of the project to be performed during the budget period exceeds the total approved budget. Such written notice shall, at a minimum, set forth (1) a detailed explanation of the factors causing the cost overrun; (2) a proposed budget revision detailing the amount of additional funds needed to complete the project; and (3) the amount of additional DOE funds, if any, the Participant is requesting.

DOE is under no obligation to provide additional funds. Under no circumstances shall the Participant incur any additional costs to be cost-shared by DOE under this Cooperative Agreement without the prior written approval of the DOE Contracting Officer.

(D) DOE/Participant Share of Additional Funds

DOE is under no obligation to award additional funds to pay for costs in excess of the Total Estimated Project Cost estimated as of the date of award. If additional DOE funds are awarded, DOE's percentage share of the allowable costs will not exceed the DOE percentage share of the Total Estimated Project Cost as shown in Article VII (B) as of the date of award. Under no circumstances will the total amount of additional DOE funds awarded exceed 25% of DOE's share of the Total Estimated Project Cost indicated at block 17 of the initial Notice of Financial Assistance Award.

ARTICLE XIII. PAYMENT

(A) General

DOE shall make payments in accordance with U.S. Department of Treasury regulations. No preaward costs will be reimbursed until DOE has signed this Cooperative Agreement.

(B) Limitation on Expenditures

DOE cost sharing may be limited by the NEPA regulations at 40 CFR Part § 1506.1 (limitation on actions during NEPA process).

ARTICLE XIV. RIGHTS IN INTELLECTUAL PROPERTY

The rights and obligations of the parties with respect to intellectual property are set forth in clauses numbered [INSERT APPROPRIATE NUMBERS] of Attachment B to this Cooperative Agreement which is hereby incorporated by reference.

ARTICLE XV. REPORTING REQUIREMENTS

Reports shall be submitted in accordance with the requirements of the Federal Assistance Reporting Checklist (Attachment C) which is hereby incorporated by reference.

ARTICLE XVI. PROCUREMENT

In selecting, awarding, and administering contracts under this Cooperative Agreement, the Participant shall abide by the requirements and goals set forth in this Article.

(A) Responsible Contractors

The Participant shall not award or approve or consent to the award of a contract to any party which is debarred or suspended or is excluded from or ineligible for participation in Federal assistance programs under the Governmentwide Debarment and Suspension (Nonprocurement) rules at 10 CFR Part 1036. Copies of these rules; the DOE Consolidated List of Debarred, Suspended, Ineligible and Voluntarily Excluded Awardees (DOE List); and the General Services Administration's (GSA) List of Parties Excluded from Federal Procurement or Nonprocurement Programs (Nonprocurement List) may be obtained from the DOE Contracting Officer.

(B) Procurement Goals

The Participant's subcontracting plans are not required; however, the Participant will take all necessary affirmative steps to assure that small businesses, small disadvantaged businesses, women-owned small business, and labor surplus area concerns are used when possible.

(C) Contract Clauses

The Participant shall use the contract clauses in Attachment D which is hereby incorporated by reference. *[These are the known required clauses, others may be added to Attachment D during negotiations as appropriate.]*

ARTICLE XVII. INSURANCE AND INDEMNITY

In addition to any insurance which is required under paragraph (A) and which may be required under paragraph (B) of this Article, the Participant shall acquire and thereafter maintain workmen's compensation, employer's liability, comprehensive general liability (bodily injury), and comprehensive automobile liability (bodily injury and property damage) insurance, and such other insurance coverage as the Participant normally carries for similar projects. With the approval of the DOE Contracting Officer, the Participant may maintain a self-insurance program for any of the coverages specified in this Article; provided that, with respect to workmen's compensation, the Participant is qualified under applicable statutory and regulatory authority. All insurance required pursuant to the provisions of this Article shall be in such form, in such amounts, for such periods of time, and provided by such insurance carriers as the DOE Contracting Officer may approve.

(A) Hazards (Property Damage)

The Participant will provide hazard insurance (theft, fire, windstorm, water damage, etc.) covering the materials, equipment, and structures acquired or constructed under this Cooperative Agreement. Proceeds from such insurance may be used to replace the damaged or destroyed property. If the Participant decides not to replace or repair the property, the insurance proceeds will be paid to DOE in the same ratio as the cost share formula applicable to the budget period of the Cooperative Agreement when the equipment or property was purchased.

(B) Flood Insurance

If funds under this Cooperative Agreement are used to acquire or construct property or equipment for use in an identified flood plain area in the United States having special flood, special flood-related erosion, or special mudslide (i.e., mud-flow) hazards, the Participant shall obtain flood insurance as required by the Flood Disaster Protection Act of 1973 (42 U.S.C. 4002, 4012a, 4105), as amended. Proceeds from such insurance may be used to replace the damaged or destroyed property. If the Participant decides not to replace or repair the property, the insurance proceeds will be paid to DOE in the same ratio as the cost share formula applicable to the budget period of the Cooperative Agreement when the equipment or property was purchased.

(C) Indemnity

The Participant shall indemnify the Government and its officers, agents, or employees for any and all liability, including litigation expenses and attorneys' fees, arising from suits, actions, or claims of any character for death, bodily injury, or loss of or damage to property or to the environment, resulting from the fault or negligence of the Participant in performing the project under this Cooperative Agreement.

ARTICLE XVIII. BONDING FOR CONSTRUCTION

The Participant shall require any construction contractor or subcontractor to obtain performance and payment bonds for any construction project in accordance with practices approved by the Contracting Officer.

ARTICLE XIX. PROPERTY MANAGEMENT AND DISPOSITION

Title to all real property, equipment and supplies (excluding Government-furnished property) acquired by or on behalf of the Participant in connection with performance of the project shall vest upon acquisition in the Participant. The Participant shall make such property available for use in the project. During the period of this Cooperative Agreement, the Participant may, with the DOE Contracting Officer's prior approval, encumber its title to or dispose of such property.

The use, management, and disposition of all Government-furnished property shall be governed by 10 CFR § 600.117 [or 10 CFR §§ 600.431, 600.432, and 600.433].

ARTICLE XX. TERMINATION

(A) Termination by Mutual Agreement

This Cooperative Agreement may be terminated, in whole or in part, by mutual agreement at any time. The initiation and negotiation of such a termination shall be conducted in accordance with the procedures set forth in 10 CFR § 600.29(d).

(B) Termination for Cause

DOE may terminate the Cooperative Agreement, in whole or in part, for cause (i.e., on the basis of a noncompliance determination). DOE shall provide advance written notice, as required by 10 CFR § 600.28, of any noncompliance determination (with a minimum 30-day opportunity to cure the non-compliance) and of any subsequent decision to terminate for cause. The Cooperative Agreement may not be terminated for delays in performance caused by fires, floods, strikes, acts or omissions of the Government, acts of God, or similar causes which are beyond the control of the Participant.

(C) Effect of Termination

DOE shall have no liability for paying the costs of any new obligations incurred by the Participant after the effective date of the termination of this Cooperative Agreement (or portion thereof). DOE shall pay its share of all noncancellable obligations properly incurred by the Participant before the effective date of the termination.

ARTICLE XXI. DISPUTES AND APPEALS

The Participant shall have the right, as specified in 10 CFR § 600.26, to appeal to the Financial Assistance Appeals Board (the Board) any of the following adverse determinations or decisions:

- 1) A determination that the Participant has failed to comply with the terms and conditions of this Cooperative Agreement, with the requirements of 10 CFR Part 600, or with the requirements of Pub. L. 101-121;
- 2) A DOE decision not to make a continuation award based on any of the determinations described in the preceding paragraph, including any determination that the Participant's performance of the project has not met the requirements of the approved Project Evaluation Plan;
- 3) A DOE termination of this Cooperative Agreement, in whole or in part, for cause;

- 4) A DOE determination that this Cooperative Agreement is void or invalid;
- 5) The application by DOE of an indirect cost rate; and
- 6) DOE disallowance of costs, including those incurred after selection but before award.

A DOE decision not to make a continuation award which is based on the unavailability of sufficient appropriated funds or on the failure to satisfy NEPA requirements may not be appealed to the Board.

ARTICLE XXII. RECORDS RETENTION, ACCESS, AND DISCLOSURE

(A) Period of Retention

The Participant shall retain all financial and performance records, supporting documents, statistical records, and other records of the Participant which are required to be retained by the terms of this Cooperative Agreement, and any other records the Participant reasonably considers to be pertinent to this Cooperative Agreement. The period of required retention shall be from the date each such record is created or received by the Participant until three years after one of the following dates, whichever is latest: the expiration date of this Cooperative Agreement; the date the Participant's final expenditure report is submitted to DOE; or if this Cooperative Agreement is terminated in its entirety, the effective date of the termination. If any claim, litigation, negotiation, investigation, audit, or other action involving the records starts before the expiration of the three-year retention period, the Participant shall retain the records until such action is completed and all related issues are resolved, or until the end of the three-year retention period, whichever is later.

(B) Authorized Copies

Copies made by microfilm, photocopying, or similar methods may be substituted for original records. Records originally created by computer may be retained on an electronic medium, provided such medium is "read only" or is protected in such a manner that the electronic record can be authenticated as an original record.

(C) Access to Records

DOE and the Comptroller General of the United States, or any of their authorized representatives, shall have the right of access to any books, documents, papers, or other records (including those on electronic media) which are pertinent to this Cooperative Agreement. The purpose of such access is limited to the making of audits, examinations, excerpts, and transcripts. The right of access described in this paragraph shall last as long as the Participant retains records which are pertinent to this Cooperative Agreement.

(D) Restrictions on Public Disclosure

The Federal Freedom of Information Act (5 U.S.C. § 552) does not apply to records the Participant is required to retain by the terms of this Cooperative Agreement. Unless otherwise required by law or a court of competent jurisdiction, the Participant shall not be required to disclose such records to the public.

ARTICLE XXIII. PUBLIC INFORMATION RELEASE

The Participant shall coordinate in advance with the DOE Contracting Officer or the COTR on all information to be issued by the Participant to the public

concerning work performed under this Cooperative Agreement. Information shall not be released to the public without first obtaining the approval of the DOE Contracting Officer or the COTR.

ARTICLE XXIV. LEGAL NOTICE/DISCLAIMER

The following notice shall be contained in all reports intended to be released to the public:

This report was prepared by _____ pursuant to a Cooperative Agreement partially funded by the U.S. Department of Energy, and neither _____ nor any of its subcontractors nor the U.S. Department of Energy, nor any person acting on behalf of either:

(A) Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately-owned rights; or

(B) Assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method or process disclosed in this report.

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Department of Energy. The views and opinions of authors expressed herein do not necessarily state or reflect those of the U.S. Department of Energy.

ARTICLE XXV. COMMERCIALIZATION

The Participant agrees to exercise its best efforts to commercialize, or to assist others to commercialize, in the United States, [*INSERT the name of the technology*].

ARTICLE XXVI. INTEREST

- (A) Notwithstanding any other term or condition of this Agreement, all amounts that become payable by the Participant to the Government under this Agreement shall bear simple interest from the date due until paid, unless paid within 30 days of becoming due. The interest rate shall be the interest rate established by the Secretary of the Treasury (Secretary) as provided in Section II of the Debt Collection Act of 1982 (31 U.S.C. 3717), which is applicable to the period in which the amount becomes due, as provided in Paragraph B of this provision, and then at the rate applicable for each 3-month period as fixed by the Secretary until the amount is paid.
- (B) Amounts shall be due at the earliest of the following dates:
- 1) The date fixed under this Agreement.
 - 2) The date of the first written demand for payment consistent with this Agreement, including any demand resulting from a termination.
 - 3) The date the Government transmits to the Participant a proposed agreement to confirm completed negotiation establishing the amount of debt.
- (C) The interest charge made under this provision may be reduced in accordance with the procedures prescribed in 4 CFR Paragraph 102.13 or in accordance with agency regulations in effect on the date of original award of this Agreement.
- (D) The requirements of this article do not apply to any amounts due the Government under operation of the Repayment Agreement.

ARTICLE XXVII. SEVERABILITY

If a court of competent jurisdiction or the DOE Financial Assistance Appeals Board determines that any part of this Cooperative Agreement is invalid, void, unenforceable, or inconsistent with any applicable Federal statute or regulation, such part shall be deemed to have been amended or deleted to conform to such determination.

ATTACHMENT A

STATEMENT OF WORK

STATEMENT OF WORK

Section 5.3.6.1 of the PON requires the proposer to provide a SOW with the proposal package. The proposed SOW will become the basis for this attachment of the Cooperative Agreement. In addition, the Project Schedule will be part of this attachment.

ATTACHMENT B

**INTELLECTUAL PROPERTY PROVISIONS
FOR
COST-SHARING COOPERATIVE AGREEMENT**

INTELLECTUAL PROPERTY PROVISIONS FOR COST-SHARING COOPERATIVE AGREEMENT

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Note to Participant:

In these clauses, the term "Contract" means Cooperative Agreement, and the term "Contractor" means Participant, unless the content of the clause clearly indicates otherwise. The use of the term "subcontractor" in any of the provisions means contractor to the Participant and all tiers of Subcontractor thereunder unless the conditions for use of a provision as set forth in the applicable regulations provide otherwise.

1. REPORTING OF ROYALTIES (10 CFR § 600.33 (C)(2))

If the Cooperative Agreement is in an amount which exceeds \$10,000 and if any royalty payments are directly involved in the Cooperative Agreement or are reflected in the Cooperative Agreement price to the Government, the Participant agrees to report in writing to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) during the performance of this Cooperative Agreement and prior to its completion or final settlement, the amount of any royalties or other payments paid or to be paid by it directly to others in connection with the performance of this Cooperative Agreement together with the names and addresses of licensors to whom such payments are made and either the patent numbers involved or such other information as will permit the identification of the patents or other basis on which the royalties are to be paid. The approval of DOE of any individual payments or royalties shall not stop the Government at any time from contesting the enforceability, validity or scope of, or title to, any patent under which a royalty or payments are made.

2. AUTHORIZATION AND CONSENT (10 CFR § 600.33(b)(5))

The Government hereby gives its authorization and consent for all use and manufacture of any invention described in and covered by a patent of the United States in the performance of this Cooperative Agreement or any part hereto or any amendment hereto or any subcontract hereunder (including all lower tier subcontracts).

3. NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (10 CFR § 600.33(b)(6))

The provisions of this clause shall be applicable only if the amount of this Cooperative Agreement exceeds \$10,000.

- (a) The Participant shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this Cooperative Agreement of which the Participant has knowledge.
- (b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this Cooperative Agreement or out of the use of any supplies furnished or work or services performed hereunder, the Participant shall furnish to the Government when requested by the Contracting Officer all evidence and information in possession of the Participant pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Participant has agreed to indemnify the Government.
- (c) This clause shall be included in all subcontracts.

4. PATENT INDEMNITY (41 CFR § 9-9.103-3(b))

The Participant shall indemnify the Government and its officers, agents, and employees against liability, including costs, for infringement of U.S. Letters Patent (except U.S. Letters Patent issued upon an application which is now or may hereafter be kept secret or otherwise withheld from issue by order of the Government) resulting from the Participant's (a) furnishing or supplying standard parts or components which have been sold or offered for sale to public on the commercial open market; (b) utilizing its normal practices or methods which normally are or have been used in providing goods and services in the commercial open market in the performance of the Cooperative Agreement; or (c) utilizing any parts, components, practices, or methods to the extent to which the Participant has secured indemnification from liability. The foregoing indemnity shall not apply unless the Participant shall have been informed as soon as practicable by the Government of the suit or action alleging such infringement and shall have been given such opportunity as is afforded by applicable laws, rules, or regulations to participate in the defense thereof; and further, such indemnity shall not apply to a claimed infringement which is settled without the consent of the Participant unless required by final decree of a court of competent jurisdiction or to an infringement resulting from addition to or change in such supplies or components furnished or construction work performed for which addition or change was made subsequent to delivery or performance by the Participant.

5. ADDITIONAL TECHNICAL DATA REQUIREMENTS (48 CFR § 952.227-73)

- (a) In addition to the technical data specified elsewhere in this Cooperative Agreement to be delivered, the Contracting Officer may, at any time during the Cooperative Agreement performance or within 1 year after final payment, call for the Participant to deliver any technical data first produced or specifically used in the performance of this Cooperative Agreement, except technical data pertaining to items of standard commercial design.
- (b) The provisions of the Rights in Technical Data clause included in this Cooperative Agreement are applicable to all technical data called for under this Additional Technical Data Requirements clause. Accordingly, nothing contained in this clause shall require the Participant to actually deliver any technical data, the delivery of which is excused by Paragraph (e) of the Rights in Technical Data clause.
- (c) When technical data are to be delivered under this clause, the Participant will be compensated for appropriate costs for converting such data into the prescribed form for reproduction, and for delivery.

6. RIGHTS TO PROPOSAL DATA (10 CFR § 600.33(b)(1))

Except for technical data contained on pages ____ of the Participant's proposal dated _____ which are asserted by the Participant as being proprietary data, it is agreed that, as a condition of the award of this Cooperative Agreement, and notwithstanding the provisions of any notice appearing on the proposal, the Government shall have the right to use, duplicate, disclose, and have others do so for any purpose whatsoever, the technical data contained in the proposal upon which this Cooperative Agreement is based.

7. PATENT RIGHTS -- SMALL BUSINESS FIRMS OR NONPROFIT ORGANIZATIONS
(37 CFR § 401.14 (a))

(a) Definitions.

- (1) "Invention" means any invention or discovery which is or may be patentable or otherwise protectable under Title 35 of the United States Code (U.S.C.) or any novel variety of plant which is or may be protected under the Plant Variety Protection Act (7 U.S.C. 2321 et seq.).
- (2) "Subject invention" means any invention of the Contractor conceived or first actually reduced to practice in the performance of work under this Cooperative Agreement, provided that in the case of a variety of plant the date of determination (as defined in section 4(d) of the Plant Variety Protection Act, 7 U.S.C. 2401(d) must also occur during the period of contract performance.
- (3) "Practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is utilized and that its benefits are, to the extent permitted by law or Government regulations, available to the public on reasonable terms.
- (4) "Made" when used in relation to any invention means the conception or first actual reduction to practice of such invention.
- (5) "Small business firm" means a small business concern as defined at Section 2 of P.L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of this clause, the size standard for small business concerns involved in Government procurement and subcontracting, at 13 CFR 121.3-8 and 13 CFR 121.3-12, respectively, will be used.

- (6) "Nonprofit organization" means a university or other institution of higher education or an organization of the type described in Section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c)) and exempt from taxation under Section 501(a) of the Internal Revenue Code (26 U.S.C. 501(a)) or any nonprofit scientific or educational organization qualified under a state nonprofit organization statute.
- (7) "Patent counsel" means the Department of Energy (DOE) patent counsel assisting the DOE contracting activity.
- (b) Allocation of principal rights.
 - (1) The Contractor may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this clause and 35 U.S.C. 203. With respect to any subject invention in which the Contractor retains title, the Federal Government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States the subject invention throughout the world.
 - (2) (Reserved.)
- (c) Invention disclosure, election of title and filing of patent application by Contractor.
 - (1) The Contractor will disclose each subject invention to the Patent Counsel within 2 months after the inventor discloses it in writing to Contractor personnel responsible for patent matters. The disclosure to the Patent Counsel shall be in the form of a written report and shall identify the Cooperative Agreement under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding, to the extent known at the time of the disclosure of the nature, purpose, operation, and the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale or public use of the invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the Patent Counsel, the Contractor will promptly notify the Patent Counsel of the acceptance of any manuscript describing the invention for publication or of any on sale or public use planned by the Contractor.

- (2) The Contractor will elect in writing whether or not to retain title to any such invention by notifying the Patent Counsel within 2 years of disclosure to the Patent Counsel. However, in any case where publication, on sale or public use has initiated the 1-year statutory period wherein valid patent protection can still be obtained in the United States, the period for election of title may be shortened by Patent Counsel to a date that is no more than 60 days prior to the end of the statutory period.
 - (3) The Contractor will file its initial patent application on a subject invention to which it elects to retain title within 1 year after election of title or, if earlier, prior in the end of any statutory period wherein valid patent protection can be obtained in the United States after a publication, on sale, or public use. The Contractor will file patent applications in additional countries or international patent offices within either 10 months of the corresponding initial patent application or 6 months from the date permission is granted by the Commissioner of Patents and Trademarks to file foreign patent applications where such filing has been prohibited by a Secrecy Order.
 - (4) Requests for extension of the time for disclosure to the Patent Counsel, election, and filing, under subparagraphs (1), (2), and (3) may, at the discretion of the Patent Counsel be granted.
- (d) Conditions when the Government may obtain title.

The Contractor will convey to the DOE, upon written request, title to any subject invention:

- (1) If the Contractor fails to disclose or elect title to the subject invention within the times specified in (c) above, or elects not to retain title; provided that the DOE may only request title within 60 days after learning of the failure of the Contractor to disclose or elect within the specified times;
- (2) In those countries in which the Contractor fails to file patent applications within the times specified in (c) above; provided, however, that if the Contractor has filed a patent application in a country after the times specified in (c) above but prior to its receipt of the written request of the Patent Counsel, the Contractor shall continue to retain title in that country; or
- (3) In any country in which the Contractor decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in a reexamination or opposition proceeding on, a patent on a subject invention.

(e) Minimum rights to Contractor and protection of the Contractor right to file.

- (1) The Contractor will retain a nonexclusive royalty-free license throughout the world in each subject invention to which the Government obtains title except if the Contractor fails to disclose the subject invention within the times specified in (c) above. The Contractor's license extends to its domestic subsidiaries and affiliates, if any, within the corporate structure of which the Contractor is a part and includes the right to grant sublicenses of the same scope to the extent the Contractor was legally obligated to do so at the time the Cooperative Agreement was awarded. The license is transferable only with the approval of DOE except when transferred to the successor of the part of the Contractor's business to which the invention pertains.
- (2) The Contractor's domestic license may be revoked or modified by DOE to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted in accordance with applicable provisions at 37 CFR 404 and 10 CFR Part 781. This license will not be revoked in that field of use or the geographical areas in which the Contractor has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of DOE to the extent the Contractor, its licensees, or its domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.
- (3) Before revocation or modification of the license, DOE will furnish the Contractor a written notice of its intention to revoke or modify the license, and the Contractor will be allowed 30 days (or such other time as may be authorized by DOE for good cause shown by the Contractor) after the notice to show cause why the license should not be revoked or modified. The Contractor has the right to appeal in accordance with 37 CFR 404 and 10 CFR Part 781, any decision concerning the revocation or modification of its license.

(f) Contractor action to protect the Government's interest.

- (1) The Contractor agrees to execute or to have executed and promptly deliver to the Patent Counsel all instruments necessary to:
 - (i) Establish or confirm the rights the Government has throughout the world in those subject inventions to which the Contractor elects to retain title, and

- (ii) Convey title to DOE when requested under (d) above and to enable the Government to obtain patent protection throughout the world in that subject invention.
- (2) The Contractor agrees to require, by written agreement, its employees, other than clerical and nontechnical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in a format suggested by the Contractor each subject invention made under this Cooperative Agreement in order that the Contractor can comply with the disclosure provisions of (c) above and to execute all papers necessary to file patent applications on subject inventions and to establish the Government's rights in the subject inventions. The disclosure format should require, as a minimum, the information required by (c)(1) above. The contract shall instruct such employees through the employee agreements or other suitable educational programs on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to United States or foreign statutory bars.
- (3) The Contractor will notify the Patent Counsel of any decision not to continue prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than 30 days before the expiration of the response period required by the relevant patent office.
- (4) The Contractor agrees to include, within the specification of any United States patent applications and any patent issuing thereon covering a subject invention, the following statement "This invention was made with Government support under (identify the Cooperative Agreement) awarded by the Department of Energy. The Government has certain rights in this invention."
- (5) The Contractor agrees to:
 - (i) Upon request, provide a report prior to the close-out of the Cooperative Agreement listing all subject inventions or stating that there were none;
 - (ii) Provide, upon request, a copy of the patent application, filing date, serial number and title, patent number and issue date for any subject invention in any country in which the Contractor has applied for a patent; and

- (iii) Provide upon request but not more than annually, listings of all subject inventions which were disclosed to DOE during the applicable reporting period.

(g) Subcontracts.

- (1) The Contractor will include this clause, suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental, or research work to be performed by a small business firm or a domestic nonprofit organization. The subcontractor will retain all rights provided for the Contractor in this clause, and the Contractor will not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.
- (2) The Contractor will include in all other subcontracts, regardless of tier, for experimental, developmental, demonstration, or research work the patent rights clause of 41 CFR 9-9.107-5(a) or 9-9.107-6 as appropriate, modified to identify the parties.
- (3) In the case of subcontracts at any tier, when the prime award with DOE was a contract (but not a grant or Cooperative Agreement) DOE, the subcontractor, and the Contractor agree that the mutual obligation of the parties created by this clause constitute a contract between the subcontractor and DOE with respect to those matters covered by this clause; provided, however, that nothing in this paragraph is intended to confer any jurisdiction under the Contracts Disputes Act in connection with proceedings under paragraph (j) of this clause.

(h) Reporting on utilization of subject inventions.

The Contractor agrees to submit on request periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the Contractor or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Contractor, and such other data and information as DOE may reasonably specify. The Contractor also agrees to provide additional reports as may be requested by DOE in connection with any march-in proceeding undertaken by DOE in accordance with paragraph (j) of this clause. As required by 35 U.S.C. 202(c)(5), DOE agrees it will not disclose such information to persons outside the Government without permission of the Contractor.

(i) Preference for United States industry.

Notwithstanding any other provision of this clause, the Contractor agrees that neither it nor any assignee will grant to any person the exclusive right to use or sell any subject inventions in the United States unless such person agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States. However, in individual cases, the requirement for such an agreement may be waived by DOE upon a showing by the Contractor or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible.

(j) March-in-rights.

The Contractor agrees that with respect to any subject invention in which it has acquired title, DOE has the right in accordance with the procedures in 37 CFR 401.6 and any supplemental regulations of DOE to require the Contractor, an assignee or exclusive licensee of a subject invention to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and if the Contractor, assignee, or exclusive licensee refuses such a request, DOE has the right to grant such a license itself if DOE determines that:

- (1) Such action is necessary because the Contractor or assignee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use;
- (2) Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the Contractor, assignee, or their licensees;
- (3) Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the Contractor, assignee, or licensees; or
- (4) Such action is necessary because the agreement by paragraph (i) of this clause has not been obtained or waived or because of licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such agreement.

(k) Special provisions for contracts with nonprofit organizations.

If the Contractor is a nonprofit organization it agrees that:

- (1) Rights to a subject invention in the United States may not be assigned without the approval of DOE, except where such assignment is made to an organization which has as one of its primary functions the management of inventions, provided that such assignee will be subject to the same provisions as the Contractor;
- (2) The Contractor will share royalties collected on a subject invention with the inventor, including Federal employee coinventors (when DOE deems it appropriate) when the subject invention is assigned in accordance with 35 U.S.C. 202 (e) and 37 CFR 401.10;
- (3) The balance of any royalties or income earned by the Contractor with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions, will be utilized for the support of scientific research or education; and
- (4) It will make efforts that are reasonable under the circumstances to attract licensees of subject inventions that are small business firms and that it will give a preference to a small business firm when licensing a subject invention if the Contractor determines that the small business firm has a plan or proposal for marketing the invention which, if executed, is equally as likely to bring the invention to practical application as any plans or proposals from applicants that are not small business firms; provided that the Contractor is also satisfied that the small business firm has the capability and resources to carry out its plan or proposal. The decision whether to give a preference in any specific case will be at the discretion of the Contractor. However, the Contractor agrees that the Secretary of Commerce may review the Contractor's licensing program and decisions regarding small business applicants, and the Contractor will negotiate changes to its licensing policies, procedures, or practices with the Secretary of Commerce when the Secretary of Commerce's review discloses that the Contractor could take reasonable steps to implement more effectively the requirements of this paragraph (k) (4).

- (l) Communications. The DOE central point of contact for communications or matters relating to this clause is the Patent Counsel.

8. PATENT RIGHTS (Long Form) (41 CFR § 9-9.107-5(a))

(a) Definitions

- (1) "Subject Invention" means any invention or discovery of the Participant conceived or first actually reduced to practice in the course of or under this Cooperative Agreement, and includes any art, method, process, machine manufacture, design or composition of matter, or any new and useful improvement thereof, or any variety of plants, whether patented or unpatented under the Patent Laws of the United States of America or any foreign country.
- (2) "Contract" means any contract, grant, agreement, understanding, or other arrangement, which includes research, development, or demonstration work, and includes any assignment or substitution of parties.
- (3) "States and domestic municipal governments" means the States of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, and any political subdivision and agencies thereof.
- (4) "Government agency" includes an executive department, independent commission, board, office, agency, administration, authority, Government corporation, or other Government establishment of the Executive Branch of the Government of the United States of America.
- (5) "To the point of practical application" means to manufacture, in the case of a composition or product, to practice in the case of a process, or to operate in the case of a machine and under such conditions as to establish that the invention is being worked and that its benefits are reasonably accessible to the public.
- (6) "Patent Counsel" means the Department of Energy Patent Counsel assisting the DOE activity.

(b) Allocation of Principal Rights

- (1) Assignment to the Government -- The Participant agrees to assign to the Government the entire right, title, and interest throughout the world in and to each Subject Invention, except to the extent that rights are retained by the Participant under Subparagraph (b)(2) and Paragraph (c) of this clause.

- (2) Greater Rights Determinations -- The Participant or the employee-inventor with authorization of the Participant may request greater rights than the nonexclusive license and the foreign patent rights provided in Paragraph (c) of this clause on identified inventions in accordance with 41 CFR 9-9.109-6d. Such requests must be submitted to Patent Counsel (with notification by Patent Counsel to the Contracting Officer) at the time of the first disclosure pursuant to Subparagraph (e)(2) of this clause, or not later than 9 months after conception or first actual reduction to practice, whichever occurs first, or such longer periods as may be authorized by Patent Counsel (with notification by Patent Counsel to the Contracting Officer) for good cause shown in writing by the Participant.

(c) Minimum Rights to the Participant

- (1) Participant License -- The Participant reserves a revocable, non-exclusive, paid-up license in each patent application filed in any country on a Subject Invention and any resulting patent in which the Government acquires title. The license shall extend to the Participant's domestic subsidiaries and affiliates, if any, within the corporate structure of which the Participant is a part and shall include the right to grant sublicenses of the same scope to the extent the Participant was legally obligated to do so at the time the contract was awarded. The license shall be transferable only with approval of DOE except when transferred to the successor of that part of the Participant's business to which the invention pertains.
- (2) Revocation Limitations -- The Participant's nonexclusive license retained pursuant to Subparagraph (c)(1) of this clause and sublicenses granted thereunder may be revoked or modified by DOE, either in whole or in part, only to the extent necessary to achieve expeditious practical application of the Subject Invention under DOE's published licensing regulations (10 CFR 781), and only to the extent an exclusive license is actually granted. This license shall not be revoked in that field of use and/or the geographical areas in which the Participant, or its sublicensee, has brought the invention to the point of practical application and continues to make the benefits of the invention reasonably accessible to the public, or is expected to do so within a reasonable time.

- (3) Revocation Procedures -- Before modification or revocation of the license or sublicense, pursuant to Subparagraph (c)(2) of this clause, DOE shall furnish the Participant a written notice of its intention to modify or revoke the license and any sublicense thereunder, and the Participant shall be allowed 30 days, or such longer period as may be authorized by the Patent Counsel (with notification by Patent Counsel to the Contracting Officer), for good cause shown in writing by the Participant, after such notice to show cause why the license or any sublicense should not be modified or revoked. The Participant shall have the right to appeal, in accordance with 10 CFR 781, any decision concerning the modification or revocation of its license or any sublicense.
- (4) Foreign Patent Rights -- Upon written request to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) and subject to DOE security regulations and requirements, there shall be reserved to the Participant, or the employee-inventor with authorization of the Participant, the patent rights to a Subject Invention in any foreign country where the Government has elected not to secure such rights provided:
- (i) The recipient of such rights, when specifically requested by DOE and 3 years after issuance of a foreign patent disclosing said Subject Invention, shall furnish DOE a report setting forth:
 - (A) The commercial use that is being made, or is intended to be made, of said invention, and
 - (B) The steps taken to bring the invention to the point of practical application or to make the invention available for licensing.
 - (ii) The Government shall retain at least an irrevocable, nonexclusive, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the Government (including any Government agency) and States and domestic municipal governments unless the Secretary or his designee determines that it would not be in the public interest to acquire the license for the State and domestic municipal governments.

- (iii) Subject to the rights granted in Subparagraphs (c)(1), (2), and (3) of this clause, the Secretary or his designee shall have the right to terminate the foreign patent rights granted in this Subparagraph (c)(4) in whole or in part unless the recipient of such rights demonstrates to the satisfaction of the Secretary or his designee that effective steps necessary to accomplish substantial utilization of the invention have been taken or within a reasonable time will be taken.
- (iv) Subject to the rights granted in Subparagraphs (c)(1), (2), and (3) of this article, the Secretary or his designee shall have the right, commencing 4 years after foreign patent rights are accorded under this Subparagraph (c)(4), to require the granting of a nonexclusive or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances, and in appropriate circumstances to terminate said foreign patent rights in whole or in part, following a hearing upon notice thereof to the public, upon a petition by an interested person justifying such hearing:
 - (A) If the Secretary or his designee determines, upon review of such material as he deems relevant, and after the recipient of such rights or other interested person has had the opportunity to provide such relevant and material information as the Secretary or his designee may require that such foreign patent rights have tended substantially to lessen competition, or to result in undue market concentration in any section of the United States in any line of commerce to which the technology relates; or
 - (B) Unless the recipient of such rights demonstrates to the satisfaction of the Secretary or his designee at such hearing that the recipient has taken effective steps or within a reasonable time thereafter is expected to take such steps, necessary to accomplish substantial utilization of the invention.

(d) Filing of Patent Applications

- (1) With respect to each Subject Invention in which the Participant or the inventor requests foreign patent rights in accordance with Subparagraph (c)(4) of this clause, a request may also be made for the right to file and prosecute the U.S. application on behalf of the U.S. Government. If such request is granted, the Participant or inventor shall file a domestic patent application on the invention within 6 months after the request for foreign patent rights is granted, or such longer period of time as may be approved by Patent Counsel for good cause shown in writing by the requestor. With respect to the invention, the requestor shall promptly notify the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) of any decision not to file an application.
- (2) For each Subject Invention on which a domestic patent application is filed by the Participant or inventor, the Participant or inventor shall:
 - (i) Within 2 months after the filing of a patent application or within 2 months after submission of the invention disclosure if the patent application has been filed previously, deliver to the Patent Counsel a copy of the application as filed including the filing date and serial number;
 - (ii) Within 6 months after filing the application or within 6 months after submitting the invention disclosure if the application has been filed previously, deliver to the Patent Counsel a duly executed and approved assignment to the Government, on a form specified by the Government;
 - (iii) Provide the Patent Counsel with the original patent grant promptly after a patent is issued on the application; and
 - (iv) Not less than 30 days before the expiration of the response period for any action required by the Patent and Trademark Office, notify the Patent Counsel of any decision not to continue prosecution of the application.
- (3) With respect to each Subject Invention in which the Participant or inventor has requested foreign patent rights, the Participant or inventor shall file a patent application on the invention in each foreign country in which such request is granted in accordance with applicable statutes and regulations and within one of the following periods:

- (i) Eight months from the date of filing a corresponding United States application, or if such an application is not filed, 6 months from the date the request was granted;
 - (ii) Six months from the date a license is granted by the Commissioner of Patents and Trademarks to file the foreign patent application where such filing has been prohibited by security reasons; or
 - (iii) Such longer periods as may be approved by the Patent Counsel for good cause shown in writing by the Participant or inventor.
- (4) Subject to the license specified in Subparagraphs (c)(1), (2), and (3) of this clause, the Participant or inventor agrees to convey to the Government upon request the entire right, title, and interest in any foreign country in which the Participant or inventor fails to have a patent application filed in accordance with Subparagraph (d)(3) of this clause, or decides not to continue prosecution or to pay any maintenance fees covering the invention. To avoid forfeiture of the patent application or patent, the Participant or inventor shall, not less than 60 days before the expiration period for any action required by any Patent Office, notify the Patent Counsel of such failure or decision, and deliver to the Patent Counsel the executed instruments necessary for the conveyance specified in this paragraph.
- (e) Invention Identification, Disclosures, and Reports
 - (1) The Participant shall establish and maintain active and effective procedures to ensure that Subject Inventions are promptly identified and timely disclosed. These procedures shall include the maintenance of laboratory notebooks or equivalent records and any other records that are reasonably necessary to document the conception and/or the first actual reduction to practice of Subject Inventions, and records which show that the procedures for identifying and disclosing the inventions are followed. Upon request the Participant shall furnish the Contracting Officer a description of these procedures so that he may evaluate and determine their effectiveness.
 - (2) The Participant shall furnish the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) on a DOE-approved form:

- (i) A written report containing full and complete technical information concerning each Subject Invention within 6 months after conception or first actual reduction to practice whichever occurs first in the course of or under this Cooperative Agreement but in any event prior to any sale, public use, or public disclosure of such invention known to the Participant. The report shall identify the contract and inventor and shall be sufficiently complete in technical detail and appropriately illustrated by sketch or diagram to convey to one skilled in the art to which the invention pertains a clear understanding of the nature, purpose, operation, and to the extent known the physical, chemical, biological, or electrical characteristics of the invention. The report should also include any request for foreign patent rights under Subparagraph (c)(4) of this clause and any request to file a domestic patent application under (d)(1) of this clause. However, such request shall be made within the period set forth in Subparagraph (b)(2) of this clause. When an invention is reported under this Subparagraph (e)(2)(i), it shall be presumed to have been conceived or first actually reduced to practice in the course of or under the contract, unless the Participant contends it was not so made, in accordance with Subparagraph (g)(2)(ii) of this clause.
- (ii) Upon request, but not more than annually, interim reports on a DOE-approved form listing Subject Inventions and subcontracts awarded containing a Patent Rights clause for that period and certifying that:
 - (A) The Participant's procedures for identifying and disclosing Subject Inventions as required by this Paragraph (e) have been followed throughout the reporting period;
 - (B) All Subject Inventions have been disclosed or that there are no such inventions; and
 - (C) All subcontracts containing a Patent Rights clause have been reported or that no such subcontracts have been awarded; and
- (iii) A final report on a DOE-approved form within 3 months after completion of the contract work listing all Subject Inventions and all subcontracts awarded containing a Patent Rights clause and certifying that:

- (A) All Subject Inventions have been disclosed or that there were no such inventions; and
 - (B) All subcontracts containing a Patent Rights clause have been reported or that no such subcontracts have been awarded.
- (3) The Participant shall obtain patent agreements to effectuate the provisions of this clause from all persons in its employ who perform any part of the work under the Cooperative Agreement except nontechnical personnel, such as clerical employees and manual laborers.
- (4) The Participant agrees that the Government may duplicate and disclose Subject Invention disclosures and all other reports and papers furnished or required to be furnished pursuant to this clause. If the Participant is to file a foreign patent application on a Subject Invention, the Government agrees, upon written request, to use its best efforts to withhold public disclosure of such invention disclosures until the expiration of the time period specified in Subparagraph (d)(1) of this clause, but in no event shall the Government or its employees be liable for any publication thereof.
- (f) Publication

It is recognized that during the course of the work under this Cooperative Agreement, the Participant or its employees may from time to time desire to release or publish information regarding scientific or technical developments conceived or first actually reduced to practice in the course of or under this Cooperative Agreement. In order that public disclosure of such information will not adversely affect the patent interests of DOE or the Participant, patent approval for release or publication shall be secured from Patent Counsel prior to any such release or publication.
- (g) Forfeiture of Rights in Unreported Subject Inventions
 - (1) The Participant shall forfeit to the Government, at the request of the Secretary or his designee, all rights in any Subject Invention which the Participant fails to report to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) within 6 months after the time the Participant:
 - (i) Files or causes to be filed a United States or foreign patent application thereon; or
 - (ii) Submits the final report required by Subparagraph (e)(2)(iii) of this clause, whichever is later.

- (2) However, the Participant shall not forfeit rights in a Subject Invention if, within the time specified in (1)(i) or (1)(ii) of this Paragraph (g), the Participant:
- (i) Prepares a written decision based upon a review of the record that the invention was neither conceived nor first actually reduced to practice in the course of or under the Cooperative Agreement and delivers the same to Patent Counsel (with notification by Patent Counsel to the Contracting Officer); or
 - (ii) Contending that the invention is not a Subject Invention, the Participant nevertheless discloses the invention and all facts pertinent to this contention to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer); or
 - (iii) Establishes that the failure to disclose did not result from the Participant's fault or negligence.
- (3) Pending written assignment of the patent application and patents on a Subject Invention determined by the Secretary or his designee to be forfeited (such determination to be a final decision under the Disputes clause of this Cooperative Agreement), the Participant shall be deemed to hold the invention and the patent applications and patents pertaining thereto in trust for the Government. The forfeiture provision of this Paragraph (g) shall be in addition to and shall not supersede other rights and remedies which the Government may have with respect to Subject Inventions.

(h) Examination of Records Relating to Inventions

- (1) The Contracting Officer or his authorized representative, until the expiration of 3 years after final payment under this Cooperative Agreement, shall have the right to examine any books (including laboratory notebooks), records, documents, and other supporting data of the Participant which the Contracting Officer or his authorized representative reasonably deems pertinent to the discovery or identification of Subject Inventions or to determine compliance with the requirements of this clause.
- (2) The Contracting Officer or his authorized representative shall have the right to examine all books (including laboratory notebooks), records, and documents of the Participant relating to the conception or first actual reduction to practice of inventions in the same field of technology as the work under this Cooperative Agreement to determine whether any such inventions are Subject Inventions, if the Participant refuses or fails to:

- (i) Establish the procedures of Subparagraph (e)(1) of this clause; or
 - (ii) Maintain and follow such procedures; or
 - (iii) Correct or eliminate any material deficiency in the procedures within 30 days after the Contracting Officer notifies the Participant of such a deficiency.
- (i) Withholding of Payment (Not Applicable to Subcontracts)
 - (1) Any time before final payment of the amount of this Cooperative Agreement, the Contracting Officer may, if he deems such action warranted, withhold payment until a reserve not exceeding \$50,000 or 5 percent of the amount of this Cooperative Agreement, whichever is less, shall have been set aside if in his opinion the Participant fails to:
 - (i) Establish, maintain, and follow effective procedures for identifying and disclosing Subject Inventions pursuant to Subparagraph (e)(1) of this clause; or
 - (ii) Disclose any Subject Invention pursuant to Subparagraph (e)(2)(i) of this clause; or
 - (iii) Deliver the interim reports pursuant to Subparagraph (e)(2)(ii) of this clause; or
 - (iv) Provide the information regarding subcontracts pursuant to Subparagraph (j)(5) of this clause; or
 - (v) Convey to the Government, using a DOE-approved form, the title and/or rights of the Government in each Subject Invention as required by this clause.
 - (2) The reserve or balance shall be withheld until the Contracting Officer has determined that the Participant has rectified whatever deficiencies exist and has delivered all reports, disclosures, and other information required by this clause.
 - (3) Final payment under this Cooperative Agreement shall not be made by the Contracting Officer before the Participant delivers to Patent Counsel all disclosures of Subject Inventions and other information required by Subparagraph (e)(2)(i) of this clause, the final report required by Subparagraph (e)(2)(iii) of this clause, and Patent Counsel has issued a patent clearance certification to the Contracting Officer.

- (4) The Contracting Officer may, in his discretion, decrease or increase the sums withheld up to the maximum authorized above. No amount shall be withheld under this paragraph while the amount specified by this paragraph is being withheld under other provisions of the Cooperative Agreement. The withholding of any amount or subsequent payment thereof shall not be construed as a waiver of any rights accruing to the Government under this contract.

(j) Subcontracts

- (1) The Participant will include the clause at 37 CFR § 401.14(a) (Small Business Firms or Nonprofit Organizations) suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental, or research work to be performed in the United States by a small business firm or a nonprofit organization. In all other subcontracts, regardless of tier for experimental, developmental, demonstration, or research work, the Participant will include a Patent Rights clause as approved by the Contracting Officer.
- (2) Except as may be otherwise provided in this clause, the Participant shall not, in any subcontract by using a subcontract as consideration therefor, acquire any rights in its subcontractor's subject invention for the Participant's own use (as distinguished from such rights as may be required solely to fulfill the Participant's contract obligations to the Government in the performance of this contract).
- (3) All invention disclosures, reports, instruments, and other information required to be furnished by the subcontractor to DOE, under the provisions of a Patent Rights clause in any subcontract hereunder may, in the discretion of the Contracting Officer, be furnished to the Participant for transmission to DOE.
- (4) The Participant shall promptly notify the Contracting Officer in writing upon the award of any subcontract containing a Patent Rights clause by identifying the subcontractor, the work to be performed under the subcontract, and the dates of award and estimated completion. Upon the request of the Contracting Officer, the Participant shall furnish a copy of the subcontract.
- (5) The Participant shall identify all subject inventions of the subcontractor of which it acquires knowledge in the performance of this Cooperative Agreement and shall notify the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) promptly upon the identification of the inventions.

- (6) It is understood that the Government is a third party beneficiary of any subcontract clause granting rights to the Government in subject inventions, and the Participant hereby assigns to the Government all rights that the Participant would have to enforce the subcontractor's obligations for the benefit of the Government with respect to subject inventions. The Participant shall not be obligated to enforce the agreements of any subcontractor hereunder relating to the obligations of the subcontractor to the Government regarding subject inventions.

(k) Background Patents

- (1) "Background Patent" means a domestic patent covering an invention or discovery which is not a subject invention and which is owned or controlled by the Participant at any time through the completion of this Cooperative Agreement:
 - (i) Which the Participant, but not the Government, has the right to license to others without obligation to pay royalties thereon, and
 - (ii) Infringement of which cannot reasonably be avoided upon the practice of any specific process, method, machine, manufacture, or composition of matter (including relatively minor modifications thereof) which is a subject of the research, development, or demonstration work performed under this contract.
- (2) The Participant agrees to and does hereby grant to the Government a royalty-free, nonexclusive license under any Background Patent for purposes of practicing a subject of this contract by or for the Government in research, development, and demonstration work only.
- (3) The Participant also agrees that upon written application by DOE it will grant to responsible parties, for purposes of practicing a subject of this contract, nonexclusive licenses under any Background Patent on terms that are reasonable under the circumstances. If, however, the participant believes that exclusive or partially exclusive rights are necessary to achieve expeditious commercial development or utilization, then a request may be made to DOE for DOE approval of such licensing by the Participant.
- (4) Notwithstanding the foregoing paragraph (k)(3), the contractor shall not be obligated to license any background patent if the contractor demonstrates to the satisfaction of the Head of the Agency or designee that the contractor or its licensees are supplying the subject matter covered by said background patent in sufficient quantity and at reasonable prices to satisfy market needs, or have taken effective steps to so supply the subject matter.

(l) (Reserved)

(m) Limitation of Rights

Nothing contained in this Patent Rights article shall be deemed to give the Government any rights with respect to any invention other than a Subject Invention except as set forth in the Patent Rights clause of this Cooperative Agreement with respect to Background Patents and the Facilities License.

(n) Facility Patent License

The Contractor agrees to and does hereby grant to the Government or others acting on its behalf, an irrevocable non-exclusive paid-up license in and to any invention of discovery of the Contractor which is incorporated or embodied in the design or construction or utilized in the operation of the Facility or which covers articles, materials or products manufactured at the Facility (1) to practice or have practiced by or for the Government at the Facility, and (2) to transfer such license with the transfer of that Facility. Further, the Contractor agrees to obtain an equivalent license from its subcontractors and licensors, if any.

9. RIGHTS IN TECHNICAL DATA (long Form) (48 CFR § 952.227-75)

(a) Definitions.

(1) "Technical data" means recorded information, regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research, experimental, developmental, or demonstration, or engineering work, or be usable or used to define a design or process, or to procure, produce, support, maintain, or operate material. The data may be graphic or pictorial delineations in media such as drawings or photographs, text in specifications or related performance or design type documents or computer software (including computer programs, computer software data bases, and computer software documentation).

Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification, and related information. Technical data as used herein do not include financial reports, cost analyses, and other information incidental to Cooperative Agreement administration.

(2) "Proprietary data" means technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data:

- (i) Are not generally known or available from other sources without obligation concerning their confidentiality;
 - (ii) Have not been made available by the owner to others without obligation concerning their confidentiality; and
 - (iii) Are not already available to the Government without obligation concerning their confidentiality.
- (3) "Contract data" means technical data first produced in the performance of this Cooperative Agreement, technical data which are specified to be delivered under this Cooperative Agreement, technical data that may be called for under the Additional Technical Data Requirements clause of this Cooperative Agreement, if any, or technical data actually delivered in connection with this Cooperative Agreement.
- (4) "Unlimited rights" means rights to use, duplicate, or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and to permit others to do so.
- (5) "Government" means the Government of the United States of America.
- (6) "Cooperative Agreement" means this Cooperative Agreement No. _____ between _____ and the Department of Energy.
- (7) "Know-how" means unpatented technical information, assistance, training or expertise including drawings, designs, specifications, blueprints, or manuals owned or controlled by the Participant.
- (8) "Facility" means the _____ facility that is to be designed, constructed, and operated as part of this Cooperative Agreement.
- (9) "Participant" means _____, signatory to this Cooperative Agreement.
- (10) "Protected Clean Coal Technology Data" means technical data or commercial or financial data first produced in the performance of this Agreement which, if it had been obtained from and first produced by a Non-Federal party, would be a trade secret or commercial or financial information that is privileged or confidential under the meaning of 5 U.S.C. 552(b)(4), and which is marked as being Protected Clean Coal Technology Data by a Party to this Agreement.

(b) Allocation of rights.

(1) The Government shall have:

- (i) Unlimited rights in contract data except as otherwise provided below with respect to proprietary data or Protected Clean Coal Technology Data;
- (ii) The right to remove, cancel, correct, or ignore any marking not authorized by the terms of this Cooperative Agreement on any technical data furnished hereunder, if in response to a written inquiry by DOE concerning the propriety of the markings, the Participant fails to respond thereto within 60 days or fails to substantiate the propriety of the markings. In either case, DOE will notify the Participant of the action taken;
- (iii) No rights under this Cooperative Agreement in any technical data which are not Contract Data.

(2) The Participant shall have:

- (i) The right to withhold proprietary data in accordance with the provisions of this clause; and
- (ii) The right to use for its private purposes, subject to patent, security, or other provisions of this Cooperative Agreement, Contract Data it first produces in the performance of this Cooperative Agreement, provided the data requirements of this Cooperative Agreement have been met as of the date of the private use of such data. The Participant agrees that to the extent it receives or is given access to proprietary data or other technical, business, or financial data in the form of recorded information from DOE or a DOE Contractor or subcontractor, the Participant shall treat such data in accordance with any restrictive legend contained thereon unless use is specifically authorized by prior written approval of the Contracting Officer; and
- (iii) The right to mark, with DOE's concurrence, as Protected Clean Coal Technology Data, any data first produced in the performance of this Agreement by its employees, in accordance with paragraph (i) of this clause.

- (3) Nothing contained in this Rights of Technical Data clause shall imply a license to the Government under any patent or be construed as affecting the scope of any licenses or other rights otherwise granted to the Government under any Patent.

(c) Copyrighted material.

- (1) The Participant shall not, without prior written authorization of the Patent Counsel, establish a claim to statutory copyright in any contract data first produced in the performance of this Cooperative Agreement. To the extent such authorization is granted, the Government reserves for itself and others acting on its behalf a royalty-free, nonexclusive, irrevocable, worldwide license for Governmental purposes to publish, distribute, translate, duplicate, exhibit, and perform any such data copyrighted by the Participant.
- (2) The Participant agrees not to include in the technical data delivered under this Cooperative Agreement any material copyrighted by the Participant and not to knowingly include any material copyrighted by others, without first granting or obtaining at no cost a license therein for the benefit of the Government of the same scope as set forth in Paragraph (c)(1) above. If such royalty-free license is unavailable and the Participant nevertheless determines that such copyrighted material must be included in the technical data to be delivered, rather than merely incorporated therein by reference, the Participant shall obtain the written authorization of the Contracting Officer to include such copyrighted material in the technical data prior to its delivery.
- (3) The Participant agrees that upon written application by the DOE it will grant to the extent practicable a non-exclusive license to responsible third parties in any copyrighted work that is utilized, tested or embodied by the Participant in the performance of work under this Cooperative Agreement or subcontract to practice the _____ system which is the subject of this Cooperative Agreement on terms and conditions which are reasonable under the circumstances.

(d) Subcontracting. It is the responsibility of the Participant to obtain from its contractors and subcontractors technical data and rights therein, on behalf of the Government, necessary to fulfill the Participant's obligations to the Government with respect to such data. In the event of refusal by a subcontractor to accept a clause affording the Government such rights, the Participant shall:

- (1) Promptly submit written notice to the Contracting Officer of the Cooperative Agreement setting forth reasons for the subcontractor refusal and other pertinent information which may expedite disposition of the matter; and
- (2) Not proceed with the subcontract without the written authorization of the Contracting Officer.

- (3) As used in this Rights in Technical Data clause, the term Contractor or Subcontractor includes any person or entity responsible for fulfilling the Participant's obligations to the Government with respect to technical data.
- (e) Withholding of proprietary data. Notwithstanding the inclusion of the additional Technical Data Requirements Clause in this Cooperative Agreement or any provision of this Cooperative Agreement specifying the delivery of technical data, the Participant may withhold proprietary data from delivery, provided that the Participant furnishes in lieu of any such proprietary data so withheld technical data disclosing the source, size, configuration, mating and attachment characteristics, functional characteristics, and performance requirements ("Form, Fit, and Function" data, e.g., specification control drawings, catalog sheets, envelope drawings, etc.), or a general description of such proprietary data where "Form, Fit, and Function" data are not applicable. The Government shall acquire no rights to any proprietary data so withheld except that such data shall be subject to the "Inspection rights" provisions of Paragraph (f), the "Limited rights in proprietary data" provisions of Paragraph (g), and, if included, the "Participant licensing" provisions of Paragraph (h), the "Availability of contract and other data" provisions of Paragraph (i), the "Commercialization of _____ technology" provisions of Paragraph (j).
- (f) Inspection rights. Except as may be otherwise specified in this Cooperative Agreement for specific items of proprietary data, which are not subject to this paragraph, the Contracting Officer's representatives, at all reasonable times up to 3 years after final payment under this Cooperative Agreement, may inspect at the participants facility any proprietary data withheld under Paragraph (e) for the purpose of verifying that such data properly fell within the withholding provisions of Paragraph (e) or for evaluating work performance.
- (g) Limited rights in proprietary data. Except as may be otherwise specified in this Cooperative Agreement as technical data which are not subject to this paragraph, the Participant shall, upon written request from the Contracting Officer at any time prior to 3 years after final payment under this Cooperative Agreement, promptly deliver to the Government any "proprietary data" withheld pursuant to Paragraph (e) of the Rights in Technical Data clause of this Cooperative Agreement. The following legend and no other is authorized to be affixed on any "proprietary data" delivered pursuant to this provision, provided the "proprietary data" meets the conditions for initial withholding under Paragraph (e) of the Rights in Technical Data clause. The Government will thereafter treat the "proprietary data" in accordance with such legend.

LIMITED RIGHTS LEGEND

This "proprietary data" furnished under Cooperative Agreement _____ with the United States Department of Energy may be duplicated and used by the Government with the express limitations that the "proprietary data" may not be disclosed outside the Government or be used for purposes of manufacture without prior permission of the Participant, except that further disclosure or use may be made solely for the following purposes:

- (1) This "proprietary data" may be disclosed for evaluation purposes under the restriction that the "proprietary data" be retained in confidence and not be further disclosed;
- (2) This "proprietary data" may be disclosed to other contractors participating in the Government's program of which this Cooperative Agreement is a part, for information or use in connection with the work performed under these contracts and under the restriction that the "proprietary data" be retained in confidence and not be further disclosed; or
- (3) This "proprietary data" may be used by the Government or others on its behalf for emergency repair or overhaul work at the Facility under the restriction that the "proprietary data" be retained in confidence and not be further disclosed.

This legend shall be marked on any reproduction of this data in whole or in part.

- (h) Participant licensing. Except as may be otherwise specified in this Agreement as technical data not subject to this paragraph, the Participant agrees that upon written application by DOE, it will grant to the Government and responsible third parties a nonexclusive license in any contract data which are proprietary data, and it will grant to responsible third parties a nonexclusive license in any contract data which are Protected Clean Coal Technology Data, for purposes of practicing a subject of this Agreement, on terms and conditions reasonable under the circumstances including appropriate provisions for confidentiality; provided, however, the Participant shall not be obligated to license any such data if the Participant demonstrates to the satisfaction of the Head of the Agency or designee that:
 - (1) Such data are not essential to the manufacture or practice of hardware designed or fabricated, or processes developed, under this Agreement;

- (2) Such data, in the form of results obtained by their use, are being supplied by the contractor or its licensees in sufficient quantity and at reasonable prices to satisfy market needs, or the contractor or its licensees have taken effective steps or within a reasonable time are expected to take effective steps to so supply such data in the form of results obtained by their use;
- (i) Availability of contract and other data.
 - (1) The Participant will, for the entire period of Participant's participation in the project at the Facility (including operation of the Facility) and for three years thereafter, whether or not under a Government Cooperative Agreement, keep and maintain all technical data, including proprietary data and data obtained from subcontractors and licensors, necessary to construct and/or operate the Facility, and all data including business and financial data necessary to evaluate the technical and economic operation of the Facility. During the entire period of construction and/or operation of the Facility, regardless of whether the Government participates past Phase I, the Participant shall permit the Government and its representative the right to inspect at the Facility any data kept and maintained pursuant to this paragraph. The Participant shall, after termination of the Government's participation in the project at the facility, periodically deliver reports to the Government on the construction and operation of the facility, which reports shall not include proprietary data.
 - (2) If the Participant withdraws from this Cooperative Agreement or defaults after Phases I or II, the Government shall have the right to have all data kept and maintained pursuant to Paragraph (1) above, delivered to the Government or otherwise disposed of as the Contracting Officer shall direct upon such termination. Any proprietary data delivered pursuant to this paragraph shall be marked as provided in Paragraph (g) above with the addition to the legend thereof as follows: (4) This "proprietary data" may be used by Government or others on its behalf in confidence to the extent necessary to enable the Government to complete Phases II and/or III.
 - (3) The Participant agrees to and does hereby grant to the Government or others acting on its behalf, an irrevocable non-exclusive paid-up license in and to any proprietary data of the Participant which are incorporated or embodied in the design or construction or utilized in the operation of the Facility: (1) to practice, or to have practiced, by or for the Government at the Facility, and (2) to transfer such license with the transfer of that Facility. Further, the Participant agrees to obtain an equivalent license from its contractors, subcontractors, and licensors, if any. The

license granted pursuant to this subparagraph shall be for the limited purpose of completion, repair or operation of the demonstration facility.

(j) Commercialization of _____ Technology.

- (1) In addition to or in assistance of any rights acquired by the Government in _____ Technology from the Participant under paragraph (k) of the Patents Clause and paragraph (h) of the Rights in Technical Data Clause, the Participant agrees to negotiate in good faith with a responsible applicant and to conclude an agreement with such applicant to provide a commercial-size facility incorporating _____ Technology in the United States equal to or a scaled-up or modified version of the _____ facility which is a subject of this Cooperative Agreement. The Agreement shall, as appropriate to the circumstances, include provisions for licensing patented and unpatented _____ Technology including background patents, waived subject inventions, proprietary data, know-how and copy-righted works including improvements or enhancements of any of the foregoing as well as provisions for technical assistance and training.
- (2) The services and/or licenses specified in (j)(1) of this paragraph shall be made available to responsible applicants to construct or have constructed, operate or have operated a facility incorporating _____ Technology in the United States under reasonable terms and conditions taking into consideration accepted licensing standards or norms in the relevant U.S. industry as well as accepted levels of return on investment for such activities and/or services.
- (3) In the event that the Participant and the applicant cannot reach agreement after one year from the start of diligent and responsible negotiations between them, then the DOE by its Secretary or designee, reserves the option to submit, with the approval of the said applicant, unresolved licensing issues to arbitration in New York under the rules of the American Arbitration Association. The Participant agrees to be bound by the results of the Arbitration.
- (4) The provisions of subparagraphs (1), (2), and (3) of this paragraph (j) shall not apply as long as the Participant or its licensees are supplying U.S. market needs at reasonable prices for _____ systems.
- (5) The Participant agrees to obtain sufficient rights to meet its commitments to commercialize and/or license _____ Technology.

- (6) The Participant agrees that neither it nor any assignee will grant to any person the exclusive right to use or sell _____ technology in the United States unless such person agrees that any embodiment of _____ technology will be manufactured substantially in the United States. However, in individual cases, the requirement for such an agreement may be waived by DOE upon a showing by the Participant or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible.
- (7) For the purposes of this section, technology is... (Define the equipment to be provided with the sale of the technology or necessary to achieve the performance under the license of the technology; this may include equipment in addition to that which is included in the Demonstration Project).
- (k) [Reserved.] (It is expected that this paragraph will include provisions that certain types of specified, mutually agreed upon data will be available to the public and will not be asserted by the Participant as proprietary or Protected Clean Coal Technology data.)
- (l) Protected Clean Coal Technology Data.
- (1) Notwithstanding any other provisions of this Rights in Technical Data clause, the Participant may, with concurrence of DOE, (i) claim and mark as Protected Clean Coal Technology Data any data first produced in the performance of this Agreement by its employees, and (ii) so claim and mark, following mutual agreement of the other party, any data first produced in the performance of this Agreement by the other party's employees.
- (2) Any such claimed Protected Clean Coal Technology Data will be clearly marked as "Protected Clean Coal Technology Data", will be treated as such, and, except as otherwise provided herein, will not be published, disseminated or disclosed to others outside the Government by the Government for a period, as approved by DOE, of [up to five (5) years after completion of the operations phase of this Agreement,] without the prior written authorization of the Participant. The marking shall include the following legend and such other restrictions or limitations on use or disclosure as may be applicable or appropriate.

*Note: The period for protection of such data is fully negotiable, but cannot exceed five years after completion of the operations phase of the particular Agreement.

PROTECTED CLEAN COAL TECHNOLOGY DATA

This Protected Clean Coal Technology Data was produced under a Cooperative Agreement identified as _____ under a DOE Clean Coal Technology Project and may not be published, disseminated or disclosed to others by the Government until [_____ years after completion of the operations phase of the above Cooperative Agreement,] unless express written authorization is obtained from _____ (the Participant). Upon expiration of the period of protection set forth in this legend, the Government shall have unlimited rights in this data. This legend shall be marked on any reproduction of this data, in whole or in part.

- (3) Any such marked Protected Clean Coal Technology Data may be disclosed under obligations of confidentiality for the following purposes:
 - (i) The Protected Clean Coal Technology Data may be disclosed to other parties and contractors performing work under the DOE Clean Coal Technology Project of which this Cooperative Agreement is a part, for information and use in performing work under the Project only.
 - (ii) The Protected Clean Coal Technology Data may be disclosed to and used by others if necessary for emergency repair or overhaul work at the Facility and to others working under the Project for purposes of evaluation.
- (4) Any such marked Protected Clean Coal Technology Data shall, upon the request of DOE, be made available to the other Participants in this DOE Clean Coal Technology Project, subject to the restrictions on disclosure, publication, and dissemination in the Legend, for use in performing work or monitoring progress under the Project and for their use in utilizing and commercializing the technology being developed under the Project.
- (5) The Participant shall have the right to license such Protected Clean Coal Technology Data or include such Protected Clean Coal Technology Data in a license with other technology developed under this Clean Coal Technology Project and, in accordance with paragraph (h) of this clause, agrees to license such Protected Clean Coal Technology Data to responsible third parties. Such licenses shall include terms and conditions that are reasonable under the circumstances, including obligations of confidentiality.

*See note on page 32.

- (6) The obligations of confidentiality and restrictions on publication and dissemination shall end for any Protected Clean Coal Technology Data:
- (i) At the end of the protected period, as indicated in the Legend, i.e. [_____ years after completion of the operations phase of this Cooperative Agreement;]
 - (ii) If the data becomes publicly known or available from other sources without a breach of the obligations of confidentiality with respect to the Protected Clean Coal Technology Data;
 - (iii) If the same data is independently developed by someone who did not have access to the Protected Clean Coal Technology Data and such independently developed data is made available without obligations of confidentiality;
 - (iv) _____ years, as agreed to by DOE, after a determination not to enter into the operations phase of this Agreement, or after the operations phase is terminated prior to completion; or
 - (v) If the Participant disseminates or authorizes another to disseminate such data without obligations of confidentiality.

*See note on page 32.

ATTACHMENT C

FEDERAL ASSISTANCE REPORTING CHECKLIST

The Participant shall prepare and submit (postage prepaid) the plans and reports indicated in this Attachment. The Participant shall be responsible for levying appropriate reporting requirements on any contractor or subcontractor in such a manner as to ensure that data submitted by the contractor or subcontractor to the Participant is compatible with the data elements that the Participant is responsible for submitting to DOE.

[The Government requires timely reporting of technical, cost, and schedule status during project performance, as well as documentation of the technical, economic, and environmental performance data that result from the project. It is the intention, whenever possible, to utilize the Participant's project status reporting system to the extent it provides the information identified in this Attachment. The requirement for the reports listed, their contents, and their frequency of submission are to be negotiated, but must be commensurate with the scope and complexity of the proposed project. Attachment C of this Model Cooperative Agreement presents the anticipated reporting effort for a typical project. If the Participant's project control and reporting system cannot satisfy the Government's requirements, then the appropriate forms embodied in the Uniform Reporting System for Federal Assistance (Grants and Cooperative Agreements) will be incorporated into the Cooperative Agreement.]

**U.S. DEPARTMENT OF ENERGY
FEDERAL ASSISTANCE REPORTING CHECKLIST**

FORM EIA-488A
(10/80)

FORM APPROVED
OMB NO. 1900-0127

1. Identification Number:	2. Program/Project Title:		
3. Recipient:			
4. Reporting Requirements: PROGRAM/PROJECT MANAGEMENT REPORTING <input checked="" type="checkbox"/> Federal Assistance Milestone Plan <input checked="" type="checkbox"/> Federal Assistance Budget Information Form <input checked="" type="checkbox"/> Federal Assistance Management Summary Report <input checked="" type="checkbox"/> Federal Assistance Program/Project Status Report <input checked="" type="checkbox"/> Financial Status Report, OMB Form 269 TECHNICAL INFORMATION REPORTING <input type="checkbox"/> Notice of Energy RD&D <input checked="" type="checkbox"/> Technical Progress Report <input checked="" type="checkbox"/> Topical Report <input checked="" type="checkbox"/> Final Technical Report	Frequency	No. of Copies	Addressees
	O, Q	1, 3	A, B
	O, X	1, 3	A, B
	O, Q	1, 4	A, B
	M	1, 3	A, B
	M	1, 3	A, B
	Q	1, 4	A, B
	A	1, 4	A, B
	F	1, 5	A, B
FREQUENCY CODES AND DUE DATES: A - As Necessary; within 5 calendar days after events. F - Final; 90 calendar days after the performance of the effort ends. Q - Quarterly; within 30 days after end of calendar quarter or portion thereof. O - One time after project starts; within 30 days after award. X - Required with proposals or with the application or with significant planning changes. Y - Yearly; 30 days after the end of program year. (Financial Status Reports 90 days). S - Semiannually; within 30 days after end of program fiscal half year.			
5. Special Instructions: The Special Instructions are attached to this checklist. In addition to the reports identified above, the deliverables identified in Sections 6.0 and 7.0 of the Special Instructions are required.			
6. Prepared by: (Signature and Date)		7. Reviewed by: (Signature and Date)	

FEDERAL ASSISTANCE REPORTING CHECKLIST

PURPOSE

This form serves to identify plans and reports selected by DOE as reporting requirements for the Federal Assistance Program/Project.

INSTRUCTIONS

Item 1 — Enter the program /project identification number as it appears in the official award.

Item 2 — Enter the program/project description as it appears in the official award.

Item 3 — Enter the name of the recipient.

Item 4 — Check spaces to indicate plans and reports selected. For each report checked, indicate frequency of delivery in column provided using one of the frequency of delivery codes as shown, as well as the number of copies requested and to whom they should be sent.

Federal Assistance Milestone Plan — presents, with the accompanying Milestone Log, a schedule of the planned activity.

Federal Assistance Budget Information Form — presents the planned costs.

Federal Assistance Management Summary Report — registers planned progress and costs to actual progress and costs in a capsulized format.

Federal Assistance Program/Project Status Report — periodically reports project status, explains variances and problems, and discusses any other areas of concern or achievements.

Financial Status Report, OMB Form 269 — presents the status of funds committed to the project.

Notice of energy R&D Project — provides information on unclassified DOE R&D Project for dissemination to the scientific, technical, and industrial communities and to the public. Also provides information to the Smithsonian Information Exchange and to the DOE Technical Information Center.

Technical Progress Report — periodically reports progress and/or results of DOE supported R&D and scientific projects covering a specific reporting period.

Topical Report — presents the technical results of work performed on a specific phase of a project.

Final Technical Report — presents a technical accounting of the total work performed on a project.

Frequency Codes — Each code represents a specific reporting frequency (such as Quarterly). These time periods are suggested in the program announcement and negotiated at the time of the award.

Item 5 — Identify any special reporting requirements or instructions not identified in Item 4. (Use additional sheets as necessary.).

Item 6 — Signature of person preparing the checklist and the date prepared. Preparation is by person responsible for program solicitation.

Item 7 — Signature of the person reviewing the checklist and date reviewed.

DISTRIBUTION

Note: DOE will provide the addresses to which the reports specified in the this attachment will be sent.

- Example:
- A. Contracting Officer's Technical Representative
Energy Technology Center
City, State
 - B. Reports Receipt Coordinator
Energy Technology Center
City, State
 - C. U.S. Department of Energy
Office of Patent Counsel
City, State

SPECIAL INSTRUCTIONS
FINANCIAL ASSISTANCE REPORTING REQUIREMENTS CHECKLIST

1.0 Project Management Reporting

Project management reporting shall be by Work Breakdown Structure (WBS) or a suitable alternative to logically and systematically define project activities for the tracking of technical, cost and schedule progress. If a WBS system is used, then the structure should be as follows:

- Level 1 -- Project
- Level 2 -- Phase (i.e., design, construction, operation)
- Level 3 -- Tasks (as defined in the Statement of Work)

If an alternate system is used, then the reporting should be detailed at least to a level comparable to WBS Level 3.

2.0 Baseline Plans

Discrete, measurable units of the proposed work are to be presented in the Baseline Plans. These plans will provide a specific outline of what the Participant intends to do, how it is intended to be accomplished, and the time and cost involved. These plans will be developed and submitted to serve as the standard against which status and progress can be measured during the performance period. The following descriptions of baseline planning forms normally used by DOE for financial assistance agreements define the type and detail of information required.

2.1 Federal Assistance Management Summary Report (Form EIA-459E).

This report is a single page form which is used to present projected cost and activity data. The cost data to be entered must depict projected total costs for the life of the project on at least a quarterly basis. The activity data required are a delineation of the project's major milestones and a bar chart displaying the projected schedule for attainment of these milestones. This form may be used for both the baseline plan and for project status reporting.

2.2 Federal Assistance Milestone Plan (Form EIA-459B).

The milestone plan is used to portray the major milestones of the project in bar chart format. The purpose of the plan is to establish the Participant's time schedule for accomplishing planned events and milestones. It covers the life of the project and is to be organized by major project activities. It should be detailed to a level equivalent to WBS Level 3. Intermediate events and critical milestones are further identified in an attached "milestone log" and include the identification number, descriptive name of the event or milestone, and the scheduled date of completion.

2.3 Federal Assistance Budget Information Form (Form EIA-459C).

This form is used to provide summary level data on the proposed total project budget. The total project budget is broken down into Federal and non-Federal funds for each major activity and shall include a separate breakdown of the total budget for each WBS Level 3 (or equivalent) activity by object class of expenditure (i.e., personnel, travel, etc.).

3.0 Status Reports

Status Reports shall provide the performance information required to determine program effectiveness and the information which DOE requires to maintain accountability for public funds. The reports must show actual costs, schedule progress, and total project status to date. When the status reports are compared with the baseline plans, accomplishments can be noted, problems become apparent, and corrective action can be taken. The following descriptions of status report forms normally used by DOE for financial assistance agreements define the type and detail of information required.

3.1 Federal Assistance Management Summary Report (Form EIA-459E).

This report is a single page form on which the Participant provides summary cumulative cost and activity data for each reporting period.

3.2 Federal Assistance Program/Project Status Report (Form EIA-459F).

This report is a single page form on which the Participant enters brief narrative discussion of the following topics: approach changes; performance and cost variances from baseline; accomplishments and problems; open milestones; and a status assessment and forecast.

3.3 Financial Status Report (Standard Form 269).

This form is used to provide DOE with regular periodic accounting of project funds expended. The accounting may be on either a cash or accrual basis. Actual total expenditures and obligations incurred, but not paid, are reported for each reporting period for each major activity. They should correlate with those WBS Level 3 (or equivalent) activities identified on the "Federal Assistance Milestone Plan." Provision must be made to identify the Federal and non-Federal share of project outlays for each identified activity. This report must also include an updated estimate of total anticipated costs for the subsequent reporting period and for completion of the project.

3.4 Program Income Reports

If Program Income is to be used to finance operations, than Program Income Reports are to be submitted to DOE. Prior to award and concurrent with each continuation application, pro forma income statements for Phase III are to be filed with DOE. During Phase III annual and quarterly income statements are to be filed and pro forma income statements for the remaining Phase III period are to be updated and filed. The income statements will clearly delineate Program Income, Variable Operating Costs and fixed operating costs. All assumptions supporting the pro forma income statements are to be provided.

4.0 Submission of Reports and Other Documents for DOE Review

The Participant shall submit to DOE for review and approval all deliverables defined in Sections 5.0, 6.0 and 7.0 of this Attachment unless specifically exempted. This review and approval shall occur prior to any submission for publication, announcement, or presentation.

Unless otherwise stated, all such scientific and technical report deliverables required by the Cooperative Agreement will be submitted in draft form to the COTR. DOE will review the draft and provide comments within 30 days of receipt from the Participant. The Participant will incorporate those comments mutually agreed to and will submit the report in final form within 30 days after receipt of DOE's comments.

All documents intended for publication, announcement, or presentation require prior clearance by DOE Patent Counsel. However, journal articles, conference papers and proceedings, etc., usually must be cleared by Patent Counsel in a relatively short period of time. Therefore, the Participant shall make direct distribution to the COTR and to DOE Patent Counsel.

All final copies of documents designated by the COTR for publication and/or announcement shall be prepared in accordance with the instructions entitled "Guidelines for Preparation of Reproducible Master (Camera-Ready) Copy of Reports" which will be furnished at a later date.

The Participant should recognize that full and comprehensive compliance of its reporting requirements under this Cooperative Agreement may involve disclosure of proprietary data to the Government for the exercise of the Government's rights in accordance with the Rights in Technical Data clause. Recognizing that the Government intends to publish, in whole, certain required reports and other information about the project which is the subject of this Cooperative Agreement while preserving the proprietary data of the Participant, the Participant shall submit all deliverables as stand-alone documents which do not contain proprietary

data. Whenever, in any deliverable, proprietary data are needed for fullness of reporting, they shall be included in a proprietary appendix.

It is the intention of DOE to publish the following reports:

- Annual Technical Progress Reports.
- Topical Reports.
- Final Technical Report.
- Public Design Reports.
- Economic Evaluation Report.
- Environmental Monitoring Plan.
- Annual Environmental Monitoring Reports.

5.0 Technical Information Reports

This information is that knowledge or information (unlimited, limited, and classified) resulting from, or pertaining to, the conduct of research and development efforts. This information reports on progress or results of DOE-funded demonstration activities and usually is published as technical reports, journal articles, reprints, theses or dissertations, conference and symposium proceedings, or translations. This may include experimental data, theoretical data, analytical studies, and economic and energy use projections. This information is used by managers, scientists, researchers, and engineers engaged in scientific and technological efforts, and is the basic intellectual resource for and result of such effort. Types of technical reports are described as follows:

- 5.1 The Technical Progress Report will summarize the work performed during a specific reporting period and will include the technical and scientific results (both positive and negative) of that period. By mutual agreement, a Technical Progress Review Meeting may take the place of a formal Technical Progress Report. In such cases, a conference record (see paragraph 6.10) and copies of the presentation materials shall be delivered to DOE within 5 days following the Review Meeting and shall constitute the Technical Progress Report for that period. At least once each year, however, a Technical Progress Report describing the progress made during the previous 12 months shall be prepared for publication. The procedures discussed in Section 4.0 apply for any Technical Progress Report to be published.
- 5.2 Topical Reports, if required, will be defined in the Statement of Work (SOW). These reports usually provide a comprehensive statement of the technical results of the work performed for a specific task or subtask of the SOW, or detail significant new scientific or technical advances. If Topical Reports are to be

prepared, DOE will first review the report outline and, once approved, subsequently review the draft report as discussed in Section 4.0.

- 5.3 The Final Technical Report is a technical account of the total work performed under the agreement. It is a comprehensive description of the results achieved and of the investigations undertaken and includes an analysis of the Participant's view and plan for marketing, commercialization, and technical readiness of the technology demonstrated. It must include tabulations of data, figures, photographs, and bibliographic citations in support of the investigations undertaken and conclusions reached. Where applicable, it summarizes all topical and technical progress reports. The Participant shall, prior to preparation of the draft, provide to DOE the report outline. Subsequent to approval of the report outline, the Participant will deliver a draft copy of the final report 60 days before the completion of the period of performance. The Government shall be allowed 30 days to review the draft copy and to notify the Participant, in writing, of agreement or recommended changes. If the Government does not agree or recommend changes within 30 days of receipt of the draft copy, the report shall be deemed acceptable. A camera-ready copy of the approved final report is due upon conclusion of the operations phase or termination of the Cooperative Agreement, whichever occurs first.

In addition, at least the following deliverables are to be provided as components of the Final Technical Report:

5.3.1 Critical Component Failure Report.

The data in this report will establish a basis for RAM analysis and confirm or modify assumptions that were made in the design phase of the project. Furthermore, these data will serve as a data base for future plants for establishing component and system reliability, availability, and maintainability. Typically, the following items should be reported for each unit/equipment failure:

- Failure identification.
- Description of failure.
- Disposition of failed item.
- Action taken.
- Remarks/recommendations/additional information.

Each piece of equipment should have a failure history report and a maintenance report.

5.3.2 Reliability, Availability, Maintainability (RAM) Analysis Data.

These data will provide RAM characteristics obtained from actual plant operation. They should be consistent in form with the above Critical Component Failure Report to allow for easy and direct comparisons.

5.3.3 Stream Data.

The Participant shall provide to the DOE a complete set of all nonproprietary stream data, including the measured flows, stream properties, and constituents at various operating conditions. These data represent the final status of the information reported in the Final Public Design Report.

5.3.4 Equipment List.

The Equipment List consists of a summary of the major equipment for the plant. Equipment is to be sorted by Flow Diagram, equipment type, and equipment number. General description data are to be provided for each equipment item, including, but not limited to, the number required for operation, size or capacity, major nonproprietary operating and design parameters, costs, associated bulk quantities, and manufacturer and/or vendor. These data represent the final status of the information reported in the Final Public Design Report.

5.3.5 Drawings.

The Participant shall include a complete set of nonproprietary Process Flow Diagrams, Equipment Plot and Elevation Drawings, and Process and Instrumentation Diagrams which describe the plant configuration at the end of the demonstration period. These drawings represent the final status of the drawings presented in the Final Public Design Report.

5.3.6 Plant Cost Data.

The Participant shall include documentation for all costs associated with the construction of the plant, with a breakdown which would permit this information to be used for projecting future plant construction costs.

6.0 Special Reports

In addition to the reports itemized on the Financial Assistance Reporting Requirements Checklist, the Participant shall also provide the deliverables listed in this section. Each deliverable title is followed by a set of symbols in parentheses which indicate delivery information consistent with the abbreviations used on the checklist. The format for the symbols in parentheses is (report frequency/number of copies/addressees) (See Page C-2).

6.1 Environmental Monitoring Plan (0/1,5/A,B).

See Appendix N of the Program Opportunity Notice for guidance in arriving at a mutually agreeable plan. A final approved plan must be delivered to DOE by a mutually agreed upon date.

6.2 Environmental Monitoring Reports (Q,Y, and A/1,5/A,B).

The results of sampling conducted under the Environmental Monitoring Plan (EMP) should be reported in quarterly and annual reports or, if appropriate, test-series reports. Test-series reports should be used if the facility is to be operated under various configurations or with different feedstocks over discrete periods or if a phased approach to monitoring is being used. All sampling results obtained under a given operating condition would then be contained in a single document. Contents of the test-series report should include:

- A summary of plant operations and sampling results.
- A description of any deviations from the EMP.
- Details of the sampling and analytical procedures.
- An analysis of performance of pollution control units.
- The results of all stream, ambient, and workplace sampling separated into compliance and supplemental monitoring.

Appendices should be included which contain the sampling and analytical data sheets and a Quality Assurance/Quality Control (QA/QC) program analysis.

During test series or phased operation, quarterly and annual reports will still be required. However, they should emphasize plant conditions and the types of sampling conducted during the reporting period rather than the results of the sampling. These reports should include:

- A description of project status.
- A summary of scheduled and completed sampling.
- A discussion of any regulatory compliance issues.
- A review of QA/QC activities during the period.

Copies of compliance reports submitted to regulatory agencies during the period.

If the facility is not operated in a phased or test series mode, then only quarterly and annual reports are required. These reports should contain the information outlined above for the test series reports. A separate fourth quarter and annual report are not required. The fourth quarter data should be included in the annual report.

Quarterly reports are due within 60 days of the end of the calendar quarter. Annual reports are due within 90 days of the end of the calendar year. Test series reports are due within 90 days following completion of the test series. DOE review and approval of these reports are not required.

6.3 Project Evaluation Plans (Each budget period except last/1,5/A,B).

Within 90 days after the beginning of each budget period except the last, the Participant will submit to the DOE for DOE approval a Project Evaluation Plan. This Plan will identify and describe the criteria by which the technical and economic feasibility of the project are to be measured. The Project Evaluation Plan as reviewed, revised, and approved by DOE will be used by the Participant for the preparation of a Project Evaluation Report to be submitted to DOE at least 60 days prior to the end of the budget period for which the Project Evaluation Plan was prepared. The approved Plan will be used by DOE as the basis for the DOE decision to continue the project to the subsequent budget period.

6.4 Project Evaluation Reports (Each budget period except last/1,5/A,B).

Formal project reviews will be conducted during each budget period. Project Evaluation Reports will provide the basis for the decision to proceed to the next budget period. These reports should describe in detail the project status and explain any deviations from the project management plan, milestone schedule, and cost plan. These reports are to be submitted 60 days prior to the completion of each budget period except the last one.

6.5 Public Design Reports (Phases 1 and 2/1,5/A,B).

The purpose of the Public Design Reports is to consolidate for public use all available nonproprietary design information on the project. Two separate reports are required. The first report is based on the preliminary design information and is due at the end of preliminary design. The second report is based on detailed design information and is due after completion of Phase 1, 60 days prior to completion of Phase 2. The second report should contain sufficient background information to provide an overview of the project and

pertinent cost data. Since the scope of the reports is limited to nonproprietary information, their content will not be sufficient to provide a complete tool in designing a replicate plant. However, these reports will serve as a reference for the design considerations involved in a commercial-scale facility.

The reports should include an overview description of the technology and a summary of the mass and energy balances for the process. They should also define the overall process performance requirements and describe the evaluations and operating philosophies upon which those performance requirements are based. A summary cost estimate of capital and operating costs and, if possible, an analysis of how costs could be improved for future commercial projects should also be included.

The following deliverables are also to be included as components of the first Public Design Report addressing the preliminary design:

6.5.1 Process Flow Diagrams

The Participant shall provide a complete set of non-proprietary Process Flow Diagrams with all updates and modifications.

6.5.2 Stream Data

The Participant shall provide a complete set of all nonproprietary stream data. This would include both the expected values and ranges of flows, stream properties, and constituents at various operating conditions.

6.5.3 Equipment List

The Equipment List consists of a summary of the major equipment for the plant. Equipment is to be sorted by Flow Diagram, equipment type, and equipment number. General description data are to be provided for each equipment item, including, but not limited to, the number required for operation, size or capacity, major nonproprietary operating and design parameters, and manufacturer and/or vendor.

The following deliverables are also to be included as components of the Final Public Design Report:

6.5.4 Stream Data

The participant shall provide to the DOE a complete set of all nonproprietary stream data. This would include both the expected values and ranges of flows, stream properties, and constituents at various operating conditions.

6.5.5 Equipment List

The Equipment List consists of a summary of the major equipment for the plant. Equipment is to be sorted by Flow Diagram, equipment type, and equipment number. General description data are to be provided for each equipment item, including, but not limited to, the number required for operation, size or capacity, major nonproprietary operating and design parameters, costs, associated bulk quantities, and manufacturer and/or vendor.

6.5.6 Drawings

The Participant shall include a complete set of nonproprietary Process Flow Diagrams, Equipment Plot and Elevation Drawings, and Process and Instrumentation Diagrams, which describe the plant configuration at the end of the demonstration period.

6.5.7 Plant Cost Data

The Participant shall include documentation for all costs associated with the construction of the plant, with a breakdown which would permit this information to be used for projecting future plant construction costs.

6.6 Environmental Report (A/1,5/A,B).

The Participant shall submit the environmental information specified in Appendix J of the Program Opportunity Notice. This detailed site and project specific information will be used as the basis for site specific NEPA documents to be prepared by DOE for each selected project. These documents shall be prepared, considered, and published in full conformance with the requirements of 40 CFR Parts 1500 to 1508, and in advance of a go/no-go decision to proceed beyond Phase 1. Federal funds for the Clean Coal Technology Program will not be provided for project activities beyond Phase 1 until the NEPA process has been successfully completed.

The Participant shall update the Environmental Report as required to reflect any project or process changes which would significantly alter the content or conclusions of the report.

6.7 Federal Cash Transactions Report (SF272) to be used for advanced payment only (M/3/B).

DOE review and approval of these reports are not required.

6.8 Technical Conference Papers and Journal Articles (A/1,3/A,B).

Publication in open literature is desirable; however, DOE requires a prepublication review and patent clearance. Copies of the proposed papers or articles must be provided to DOE as explained in Section 4.0 above.

6.9 Public Information Release (A/1,5/A,B). See Article XXIII of this Cooperative Agreement.

6.10 Conference Record (A/1,3/A,B).

The Conference Record documents for the DOE COTR, DOE Contracting Officer, and the Participant an understanding of significant decisions, direction or redirection, or required actions resulting from meetings with DOE representatives. It is required for all formal project review meetings, including technical progress reviews, design and construction reviews, and operations reviews. It is also required for any meeting, conference, or phone conversation in which a decision is made that may significantly change the schedule, labor, cost, or technical aspects of the contractual agreement or the approved baseline plans. The report shall contain the following information as applicable:

- Report title ("Conference Record"), number, and the date prepared.
- Agreement title and number and the Participant's name and address.
- Date of meeting or telephone conversation with a list of those involved and their titles.
- Subject(s) discussed, decisions reached, and directions given.
- Variances from previous directions and conclusions.
- Required actions.
- Distribution.
- Signature of preparer.

6.11 Hot Line Report (A/1,4/A,B).

The "Hot Line" Report may be used to report a major breakthrough in research, development, or design; an event causing a significant schedule slippage or cost overrun; achievement or failure to achieve an important technical objective; or any requirement for quickly documented direction or redirection. Examples include:

Any change in the availability of funds which the Participant believes may have a material and adverse effect on the project.

Any change in supply contracts or market conditions which the Participant believes may have a material and adverse effect on the project.

Any suspension, revocation or denial of a permit or any notice of a potential violation of a permit, the loss or absence of which the Participant believes may have a material and adverse effect on the project.

Any default or threatened default by any contractor that the Participant believes may have a material and adverse effect on the project.

The report shall be submitted by the most rapid means available, usually electronic, and should confirm telephone conversations with DOE representatives. Identification as a "Hot Line Report" serves notice at each link in the delivery chain that speed in handling is required. Unless otherwise agreed by the parties involved, DOE is expected to take action and respond in a similarly expeditious manner. The report should include:

- Participant's name and address.
- Agreement title and number.
- Date.
- Brief statement of problem or event.
- Anticipated impacts.
- Corrective action taken or recommended.

In addition to those incidents noted above, special attention should be given to using Hot Line Reports to document the incidents listed below.

Any fatal or imminently fatal injury, accident, or any incident involving hospitalization of five or more persons is to be immediately reported.

Any significant environmental permit violation is to be reported as soon as possible, but within 12 hours of incident.

Other incidents that have the potential for high visibility in the media are to be reported as quickly as possible, but no later than 12 hours. When an incident is reported in accordance with the following two items, the participant shall conduct an investigation of its cause and make an assessment of the adequacy of resultant action. A written report is required on a schedule to be established at the time of the initial report.

Any unplanned event which is anticipated to cause a schedule slippage or cost increase significant to the project is to be reported as soon as possible but within 5 working days.

An incident which causes a significant process or hazard control system failure, or is indicative of one which may lead to any of the above defined incidents, is to be reported as soon

as possible, but within 5 working days. When an event results in the need to issue a written or verbal statement to the local media, the statement is to be cleared first, if possible, by the appropriate Energy Technology Center's Public Information Officer and coordinated with the COTR.

DOE review and approval of these reports are not required.

7.0 Reports Called for in Statement of Work

The Participant shall provide the following deliverables called for in the Statement of Work, Attachment A:

7.1 PHASE 1

7.1.1 Project Management Plan (O,A/1,5/A,B)

A detailed Project Management Plan shall be provided in accordance with the guidelines in Appendix 1 to Attachment A. The plan shall be updated as appropriate to reflect significant changes to the project baseline.

7.2 PHASE 2

7.2.1 Project Management Plan (A/1,5/A,B)

The plan shall be updated as appropriate to reflect significant changes to the project baseline.

7.2.2 Plant Start-Up Plan (A/1,5/A,B)

The Participant shall prepare a Plant Start-Up Plan. The plan will be defined by the system descriptions (SD's) and a plant start-up schedule. The boundary of each SD will be identified on appropriate drawings. The plant start-up schedule incorporating the SD's will be developed after completion of a list of SD's during Phase 2. The plan will be submitted to the DOE at least 60 days prior to its implementation.

7.2.3 Test Plan (A/1,5/A,B)

The Participant shall develop a Test Plan for the demonstration period of the facility. This document will provide for demonstration tests to obtain the data base and experience necessary for the detailed design, operation, control and maintenance of large-scale commercial plants. The Test Plan shall describe the overall test program goals, the strategies for achieving those goals, and the sequencing of individual tests. It should include detailed discussion of such topics as test matrices, procedures for sampling and analysis, data

manipulation methods, success criteria, and manning schedules. It should also designate the Participant's plans for preparing and submitting the Demonstration Test Reports described in Section 7.3.2 below.

The Test Plan is to be developed in Phase 2 and submitted to the DOE for approval at least 60 days prior to the commencement of Phase 3.

7.2.4 Start-Up and Modification Report (A/1,5/A,B)

A Start-Up and Modification Report shall be provided to DOE for review within 60 days following the completion of plant start-up. Any process or equipment modifications made to the originally reported design of plant, as a result of late design changes or deficiencies encountered during commissioning and start-up activities, should be documented. The scope of the report should:

- Describe the problem with the particular process or item of equipment.
- Identify the modification that was implemented to correct the problem.
- Evaluate the impacts of the modification.
- Document the cost of the modification.

The start-up activities should also be documented giving information such as:

- Planned and actual start-up schedule.
- Production rate buildup.
- Environmental data.
- Cost data on start-up and start-up modifications.

If performance tests are carried out, the results should be reported in this document. Performance tests are tests carried out on process units to verify that each unit will operate as designed before the unit is accepted from the vendor and turned over to the plant operating staff. Typically, these tests will provide the operating data (flow rate, temperature, pressure, analytical data, etc.) needed to confirm the performance of the unit.

7.3 PHASE 3

7.3.1 Project Management Plan (A/1,5/A,B)

The plan shall be updated as appropriate to reflect significant changes to the project baseline.

7.3.2 Demonstration Test Reports (Q,A/1,5/A,B)

Demonstration Test Reports shall document and discuss plant operating data and performance. These reports shall be based, if possible, on logical subdivisions in the test plan (campaigns, test series, etc.) which differentiate a significant change in feedstock, a period of sustained operation, or a change in operating conditions, for example. The reports shall be provided on at least a quarterly basis, even if a natural test plan segment cannot be documented within that time frame.

7.3.3 Disposition Plan (A/1,3/A,B)

(A Disposition Plan is not required if disposition of the demonstration facility was not proposed.)

7.3.4 Technology Performance and Economic Evaluation Report (A/1,5/A,B)

The Participant shall prepare and provide to DOE an Economic Evaluation Report which discusses the Participant's results of an economic analysis and evaluation for commercializing the demonstrated technology. This report should be a natural result of the Participant's commercial plant design and should discuss the Participant's experience in operating the technology. The report should include a discussion of costs associated with:

- Capital equipment.
- Land.
- Coal.
- Water.
- Electricity.
- Operating costs.
 - Personnel.
 - Expendables.
 - Fees.
- Project contingency.
- Process contingency.
- Construction costs.
- Interest rates assumed.

A draft of this report shall be submitted to DOE no later than 60 days prior to the completion of Phase 3, upon earlier completion of the Cooperative Agreement, or upon termination of the Agreement, whichever occurs first.

ATTACHMENT D

CONTRACT CLAUSES

CONTRACT CLAUSES

For purposes of this Attachment, the term "contract" means a procurement contract awarded under the Cooperative Agreement and a procurement subcontract awarded under such a contract; the term "solicitation" means an invitation for bids, request for quotations or proposals, or any other type of solicitation issued by the Participant for the purpose of awarding a contract. The following clauses shall be included, as indicated below, in contracts and in solicitations:

1. For contracts other than small purchases: administrative, contractual, or legal remedies for violations or breaches of contract terms.
2. For contracts over \$10,000: provisions for terminating the contract for default or for convenience, including the manner by which the termination will be effected and the basis for settlement.
3. For construction contracts over \$10,000: a requirement that the contractor comply with Executive Order 11246 of September 24, 1965 entitled "Equal Employment Opportunity," as amended by Executive Order 11375 of October 13, 1967 and as supplemented in U.S. Department of Labor regulations (41 CFR Part 60).
4. For all construction or repair contracts: a requirement that the contractor comply with the Copeland Anti-Kickback Act (18 U.S.C. 874) as supplemented in U.S. Department of Labor regulations (29 CFR Part 3).
5. For construction contracts over \$2,000 and for all contracts over \$2,500 involving the services of mechanics or laborers: a requirement that the contractor comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330) as supplemented by U.S. Department of Labor regulations (29 CFR Part 5).

6. For all contracts other than small purchases: a clause requiring the contractor to furnish such information the Participant must receive in order to comply with the reporting requirements under this Cooperative Agreement.

7. For all contracts over \$10,000: a clause requiring the contractor to retain records pertinent to the contract for three years after the contractor receives final payment. The clause must also provide that if an audit, litigation, or other action involving the contract records commences before the end of the three-year retention period, the records must be retained until all issues arising out of the action are resolved, or until the end of the three-year period, whichever is later.

8. For all contracts over \$10,000: a clause providing that the Participant, DOE, and the Comptroller General of the United States, or any of their duly authorized representatives shall have access to any books, documents, papers, and records (including those on electronic media) of the contractor which are directly pertinent to that specific contract for the purpose of making audit, examination, excerpts, and transcripts. This clause shall specify that the right of access shall last as long as the contractor retains records which are directly pertinent to that specific contract.

9. For contracts and subcontracts over \$100,000: a clause requiring the contractor or subcontractor to comply with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h)), section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15).

10. For all contracts and subcontracts: a clause requiring compliance with all applicable mandatory standards and policies relating to energy efficiency contained in the state energy conservation plan issued pursuant to the Energy Policy and Conservation Act (42 U.S.C. 6201, et seq.).

11. In solicitations: the following Instructions for and Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions:

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions Instructions for Certification

1. By signing and submitting this proposal, the prospective lower tier Participant is providing the certification set out below.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier Participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the U.S. Department of Energy may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier Participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier Participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "Nonprocurement List," "DOE List," "Participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the DOE rules implementing Executive Order 12549. See, 10 CFR Part 1036 [53 F.R. 19204 (May 26, 1988)]. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of these rules.

5. The prospective lower tier Participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the U.S. Department of Energy.

6. The prospective lower tier Participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A Participant in a covered transaction may rely upon a certification of a prospective Participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A Participant may decide the method and frequency by which it determines the eligibility of its principals. Each Participant may, but is not required to, check the Nonprocurement List.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a Participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a Participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this

transaction, in addition to other remedies available to the Federal Government, the U.S. Department of Energy may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions

(1) The prospective lower tier Participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier Participant is unable to certify to any of the statements in this certification, such prospective Participant shall attach an explanation to this proposal.

12. In solicitations, the following certification regarding lobbying:

CERTIFICATION FOR CONTRACTS, GRANTS, LOANS, AND COOPERATIVE AGREEMENTS

The undersigned certifies that, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the Federal contract, grant, loan or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact which reliance was placed upon when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$100,000 for each such failure.

APPENDIX M

MODEL REPAYMENT AGREEMENT

MODEL REPAYMENT AGREEMENT

ARTICLE I. GENERAL OBJECTIVE

The purpose of this agreement is to set forth the terms and conditions under which _____ (defined herein as the Participant) shall repay to the United States Department of Energy (DOE) an amount up to (i.e., not to exceed) the Government's share of total project costs paid under Cooperative Agreement No. DE- _____.

ARTICLE II. DEFINITIONS

"Contracting Officer" means the DOE official authorized to execute awards, financial agreements, and amendments thereto on behalf of DOE and who is responsible for administering this Repayment Agreement.

"Cooperative Agreement" means the financial assistance award made by the United States Department of Energy (DOE) to the Participant, Instrument Number _____ on _____, 1991 and subsequent amendments.

"DOE" means the United States Department of Energy and any successor department or agency.

"DOE share" means the portion of the total project costs paid by DOE under the Cooperative Agreement.

"Government" means the government of the United States, including DOE.

"Participant" means [INSERT NAME OF ORGANIZATION SIGNING THE REPAYMENT AGREEMENT] and its successors and assigns.

"Project" means the set of activities described in Article IX (Allowable Preaward Costs) and in Attachment A, Statement of Work, of the Cooperative Agreement.

"Total project costs" means the total amount of allowable direct and indirect costs incurred by the Participant and paid, in part, by DOE under the Cooperative Agreement.

"United States" means any of the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, and any territory or possession of the United States.

ARTICLE III. TERM OF THIS REPAYMENT AGREEMENT

This Repayment Agreement shall become effective on the date specified in the Cooperative Agreement as the end of Phase 3 (Operation), except that if the Participant unilaterally withdraws or terminates its participation under the Cooperative Agreement, this Repayment Agreement shall become effective on the date the Cooperative Agreement is terminated. This Repayment Agreement shall expire 20 years from its effective date or on the date the entire DOE share has been repaid. This Repayment Agreement may be terminated upon a determination by the Secretary of Energy or designee that repayment places the Participant at a competitive disadvantage in domestic or international markets.

ARTICLE IV. DEMONSTRATION TECHNOLOGY

For purposes of this Repayment Agreement, the "Demonstration Technology" shall consist of [*DOE and the Participant will agree on this description*].

ARTICLE V. AMOUNT OF REPAYMENT

The amount of the Participant's repayment obligation shall be based only on the sale, lease, or licensing of the Demonstration Technology, as defined in Article IV, in applications and for use at facilities located in the United States. The amount of repayment shall be based upon the revenues from the sum

of one or both of the following sources during commercialization of the Demonstration Technology:

<u>Repayment Amount</u>	<u>Revenue Source</u>
0.5%	Gross revenues from equipment sales/leases
5.0%	Royalties and licensing fees

For purposes of determining the amount of repayment, commercialization shall be deemed to have begun on the effective date of this Repayment Agreement or *[INSERT DESCRIPTION OF TRIGGERING EVENT(S) WHICH DEFINE THE GRACE PERIOD: E.G., ALL SALES AFTER THE 3RD UNIT OF THE DEMONSTRATION TECHNOLOGY]*, whichever occurs later.

(A) Sales/Leases of Equipment

The Participant shall pay DOE an amount equal to 0.5% of the gross revenues from the sale or lease of equipment manufactured, fabricated, or assembled as a result of commercialization of the Demonstration Technology. The Participant shall include in all contracts or agreements with any entity which is involved, directly or indirectly, in manufacturing, selling, leasing, or licensing the use of Demonstration Technology equipment, a provision requiring that sales and leases of such equipment and associated revenue be reported on an annual basis to the Participant. A list of entities (including name, address, and telephone number of responsible official) subject to this reporting requirement is provided in Attachment A and shall be updated, as necessary, by the Participant.

(B) License Fees

The Participant shall pay DOE an amount equal to 5.0% of the gross revenues from license fees paid for use of the Demonstration Technology. The Participant shall include in all contracts or agreements with any entity which acquires the right to license the use of the Demonstration Technology, a provision requiring that all such licenses and sub-licenses and associated revenues be reported on an annual basis to the Participant. A list of entities (including name, address, and telephone number of responsible

official) subject to this reporting requirement is provided in Attachment B and shall be updated, as necessary, by the Participant.

(C) Alternative Sources

[INSERT ANY PERTINENT PROVISIONS DURING NEGOTIATIONS]

ARTICLE VI. SCHEDULE OF REPAYMENTS

Payments to DOE shall be calculated on an annual basis, and shall be due within 60 days after each one-year period following the effective date of this Repayment Agreement.

ARTICLE VII. REPORTING AND RECORD RETENTION REQUIREMENTS

(A) Annual Report to DOE

Within 60 days after the end of each one-year period, the Participant shall submit a written report to DOE which, for the one-year period just elapsed, provides the applicable data described below:

(1) The total dollar amount of sales and leases of Demonstration Technology equipment;

(2) Quantities and descriptions of Demonstration Technology equipment sold and leased;

(3) The total dollar amount of license fees paid for use of the Demonstration Technology;

(4) Quantities and descriptions of Demonstration Technology transactions under which license fees were paid;

(5) The total amount of revenue reported by each entity identified in Attachments A and B;

(6) Sum of the total amounts of gross revenues from each of the sources described in Article V, Sections A and B; and

(7) The total amount owed or paid to DOE, and the amount of the DOE share remaining to be paid in succeeding years under this Repayment Agreement.

(B) Period of Retention

With respect to each annual report to DOE, the Participant shall retain, for the period of time prescribed in this paragraph, all related financial records, supporting documents, statistical records, and any other records the Participant reasonably considers to be pertinent to this Repayment Agreement. The period of required retention shall be from the date each such record is created or received by the Participant until three years after one of the following dates, whichever is earlier: the date the related annual report is received by DOE; or the date this Repayment Agreement expires or the final payment to DOE is received. If any claim, litigation, negotiation, investigation, audit, or other action involving the records starts before the expiration of the three-year retention period, the Participant shall retain the records until such action is completed and all related issues are resolved, or until the end of the three-year retention period, whichever is later. The Participant shall not be required to retain any records which have been transmitted to DOE by the Participant.

(C) Authorized Copies

Copies made by microfilm, photocopying, or similar methods may be substituted for original records. Records originally created by computer may be retained on an electronic medium, provided such medium is "read only" or is protected in such a manner that the electronic record can be authenticated as an original record.

(D) Access to Records

DOE and the Comptroller General of the United States, or any of their authorized representatives, shall have the right of access to any books, documents, papers, or other records (including those on electronic media) which are pertinent to this Repayment Agreement. The purpose of such access is limited to the making of audits, examinations, excerpts, and transcripts. The right of access described in this paragraph shall last as long as the Participant retains records which are pertinent to this Repayment Agreement.

(E) Restrictions on Public Disclosure

The Federal Freedom of Information Act (5 U.S.C. § 552) does not apply to records the Participant is required to retain by the terms of this Repayment Agreement. Unless otherwise required by law or a court of competent jurisdiction, the Participant shall not be required to disclose such records to the public.

(F) Flow Down of Records Retention and Access Requirements

In any contract or other agreement subject to the reporting requirements described in Article V, Sections A and B, the Participant shall include clauses substantially similar to the records retention and access requirements set forth in sections (B) and (D) of this Article.

ATTACHMENTS

- A. Purchasers and Lessees of Demonstration Technology Equipment.
- B. Entities Required to Pay License Fees.

Signature of Authorized Official

Date

Name

Title

Signature of DOE Contracting Officer

Date

Name

Title

APPENDIX N

ENVIRONMENTAL MONITORING PLAN GUIDELINES

GUIDELINES FOR ENVIRONMENTAL MONITORING PLAN

I. PURPOSE

The Department of Energy (DOE) views the identification and characterization of areas of concern and the development of an information base for the assessment and mitigation of impacts associated with the replication of Clean Coal Technology projects to be a fundamental purpose of environmental and health monitoring and an important component of the demonstration project. Monitoring should identify the environmental constraints and/or advantages of potential commercial versions of the demonstrated technology. In addition, environmental monitoring may be necessary to quantify the project-specific and site-specific environmental impacts predicted in the National Environmental Policy Act (NEPA) documentation, to detect any environmental and health problems requiring remedial action, and to confirm the performance of environmental mitigation measures implemented as part of the project. Toward these ends, DOE requires that the participant perform a broad range of monitoring activities, to the extent appropriate to the circumstances of the project, related to potential environmental and health impacts of the project and technology, and to document these monitoring activities in the form of an Environmental Monitoring Plan (EMP).

II. ORGANIZATION AND APPROACH

DOE requires the Participant to complete an EMP and to specifically address two classes of monitoring activity: compliance monitoring and supplemental monitoring. The two classes are defined in terms of the objectives for monitoring and serve as a basis for systematic planning and analysis. The classes are as follows:

Class I, Compliance Monitoring, is the monitoring required by other agencies of Federal, state and local government (other than DOE) to satisfy statutes, regulations, and terms of leases, permits, grants, and other requirements. The EMP documents the extent of compliance monitoring activities, provides for

reporting of relevant results to DOE, and shows their relationship to monitoring activities to meet the objectives of Supplemental Monitoring.

Class II, Supplemental Monitoring, is monitoring required in addition to compliance monitoring to establish the environmental characteristics and potential impacts of the clean coal technology and associated facilities, processes, and activities. This monitoring is intended to satisfy two objectives: first, to develop the information base for identification, assessment, and mitigation of environmental problems associated with the replication of the technology; and second, to identify and confirm environmental impacts and performance predicted in the NEPA documentation.

With regard to the first objective, activities may include but are not limited to measurements of processes, feedstocks, operating conditions, discharges, ambient environmental conditions, industrial hygiene, occupational health and safety, and impacts on public health and ecological systems. Environmental characterization emphasizes the special attributes of the technology and pollutants specific to it, rather than attributes common to existing commercial technologies. The Participant will be required to identify the salient process and operating parameters that are likely to affect environmental discharge rates and compositions, waste generation, and other relevant environmental characteristics of construction and operation. The EMP must show how information about those parameters will be reported and related to analyses of the monitoring data. Monitoring of ambient environmental concentrations and impacts may be required to assist characterization of the source and/or to assess the transport and effects of pollutants or other impacts of the technology that are poorly understood.

To meet the second objective of supplemental monitoring, the Participant may be required to conduct monitoring activities to identify and confirm potential environmental impacts identified in the Environmental Report and in subsequent NEPA documentation. It is recognized that, in some cases, no supplemental monitoring may be required to meet this objective. In the latter cases, the basis for the determination that such supplemental monitoring is not required should be stated in the Draft EMP and Final EMP.

Monitoring should be considered for all phases of the project, including pre-construction, pre-operation, demonstration, post-demonstration operation, shut-down, site reclamation, and long-term monitoring of disposed wastes, disturbed ecosystems, and performance of mitigative measures, where appropriate. Environmental impacts of operation and disposition of the facility after completion of the CCT demonstration phase must be considered by DOE, where required by its responsibilities under NEPA. The DOE, in consultation with the Participant and others, will determine whether and to what degree monitoring is required to ensure that the continued safety and limitations of adverse environmental impacts resulting from the CCT Demonstration Project predicted in NEPA documentation will be achieved. The EMP will reflect the results of this determination.

In cases of the uncertain occurrence of environmental effects or formation and transport of pollutants to media, a phased approach to monitoring should be considered. In such cases, initial characterization or monitoring should be used to determine the need and scope for further monitoring activity. Participants should indicate analyses, reports, decision milestones, and points for DOE review in the EMP.

III. IMPLEMENTATION

TIMING

The EMP shall be developed, in consultation with DOE, in two stages, as described herein. The Participant is required to develop a Draft EMP that must be delivered to DOE during the first project budget period. The Final EMP must then be developed in consultation with DOE no later than 60 days after commencement of Phase 2 of the project. It should be recognized that the Final EMP is subject to revision and updating as the project continues.

CONTENTS OF EMP

The Draft EMP may contain general information about the monitoring activities; whereas, the Final EMP will specify the details regarding the sampling locations,

monitoring parameters, and procedures. A suggested format for the EMP is provided as Attachment A to this Appendix. This format is not mandatory, but all topics that are relevant should be addressed.

EMP Purpose and Scope - This section should define the overall approach to the monitoring and measurement activities. If a phased approach is to be used, the logic flow and decision criteria should be discussed. The scope of the monitoring should be described in terms of both duration and environmental media considered.

Project/Process Description - The technology should be described, with reference to appropriate process flow diagrams. Process and discharge streams should be identified, along with descriptions of pollution control systems.

Compliance Monitoring - The permits and the conditions of the permits should be presented in this section. The monitoring requirements of the permits should be discussed in terms of both the type of monitoring (source, ambient, etc.) and the timing (i.e., phase of the project). This provides the basis for determining what types of supplemental monitoring may be required.

Supplemental Monitoring - The two overall objectives related to supplemental monitoring should be discussed: (1) to develop the information base for identification, assessment, and mitigation of environmental problems associated with the replication of the technology; and, (2) to identify and confirm environmental impacts and performance predicted in the NEPA documentation. The specific plans to meet these objectives should be described. The parameters that establish process operating conditions and determine environmental discharge characteristics can be defined. The procedures for establishing environmental performance and operating conditions should be addressed. Finally, the schedule for this monitoring should be described in terms of duration and frequency.

Integration of Compliance and Supplemental Monitoring - In order to eliminate any redundancy between compliance and supplemental monitoring, the two should be integrated, with the monitoring activities then broken down by project

phase and monitoring media. Tables should be prepared that show the parameters to be monitored, the stream/sampling point identification, the frequency of sampling, and the value to be reported (e.g., average, minimum/maximum, range).

Data Management & Reporting - This section should describe the data management system to be used. The reporting schedule should be given (e.g., quarterly and annual reports). The content and format of the reports should be described, including the types of analyses to be provided (e.g., heat and material balances, trace element distribution, pollution control equipment performance).

ATTACHMENT A

GUIDELINES FOR ENVIRONMENTAL MONITORING PLAN

ENVIRONMENTAL MONITORING PLAN

-- SUGGESTED FORMAT --

1.0 SUMMARY

2.0 INTRODUCTION

2.1 EMP Purpose and Scope

2.2 Background & History of the Project

2.2.1 Project Schedule

2.2.2 Project Site

3.0 PROJECT/PROCESS DESCRIPTION

3.1 Process Flow Description

3.2 Site & Facilities Description

3.2.1 Raw Material Storage & Handling

3.2.2 Product Storage & Handling

3.2.3 Intermediates & By-Products Storage & Flows

3.2.4 Utilities & Offsite Facilities (including waste disposal sites)

3.3 Emissions & Discharges

3.3.1 Atmospheric Emissions & Control Systems

3.3.2 Aqueous Discharges & Control Systems

3.3.3 Waste Discharges & Management Systems

4.0 COMPLIANCE MONITORING

4.1 Scope of Permits & Permit Conditions

4.1.1 Source Monitoring

4.1.2 Ambient Monitoring

4.1.3 Workplace Monitoring

4.1.4 Process & Operating Conditions Monitoring

4.2 Activities by Phase

4.2.1 Pre-Construction (baseline)

4.2.2 Construction

4.2.3 Operation

4.2.4 Facility Shut-Down & Site Reclamation

4.2.5 Post Shut-Down

5.0 SUPPLEMENTAL MONITORING

5.1 Purpose

5.1.1 Environmental Characterization Related to Commercialization

5.1.2 Environmental Impacts Related to NEPA

5.2 Scope

5.2.1 Test Plans

5.2.2 Process Measurements

5.2.3 Heat & Material Balances

5.2.4 Environmental Performance of Overall Plant and Subsystems

5.2.5 Personnel Exposure and Workplace Monitoring

5.2.6 Public Safety & Emergency Response

5.3 Schedule

5.3.1 Duration of Monitoring

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6.1.4 Terrestrial Ecology

- 6.1.5 Aquatic Ecology
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 - 6.2.1 Gaseous Discharges
 - 6.2.2 Aqueous Discharges
 - 6.2.3 Waste Generation and Disposal
 - 6.2.4 Noise Levels
 - 6.2.5 Ambient Impacts
 - 6.2.6 Worker Health & Exposure
- 6.3 Operational Monitoring
 - 6.3.1 Process and Operating Conditions
 - 6.3.2 Gaseous Streams
 - 6.3.3 Aqueous Streams
 - 6.3.4 Solid Wastes
 - 6.3.5 Ambient Air Quality
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 - 6.3.7 Ground Water Quality
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 - 6.4.2 Surface Water Quality
 - 6.4.3 Ground Water Quality
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 - 6.4.6 Disposal Site Conditions

7.0 Data Management & Reporting

7.1 Purpose & Scope

7.2 Data Management System

7.3 Reporting Schedule

7.4 Content & Format of Reports

Appendices

NEPA Documentation

Waste Management Plan

Industrial Hygiene Program

Sampling & Analytical Procedures

QA/QC Program

APPENDIX 0

PREAWARD ACCOUNTING SYSTEM INFORMATION

NOTE: The information described in this Appendix need not be submitted with the proposal.

This Appendix is intended for the proposer's information to assist with planning the project. The information discussed herein will be required immediately after selection.

APPENDIX 0

PREAWARD ACCOUNTING SYSTEM INFORMATION

The purpose of Appendix 0, Preaward Accounting System Information, is to assist DOE in determining the adequacy and suitability of an organization's accounting system and its practices for accumulating costs under a Government award (contract, grant, or cooperative agreement). This questionnaire should be completed by a responsible financial representative of the participant and each of its proposed subcontractors.

Participants and their proposed subcontractors should recognize that an operable accounting system that is under general ledger control is of paramount importance. This system should be developed as soon as the company anticipates an award. A company who has not done business with the Federal government before may benefit from employing personnel or consultants who have an understanding of the applicable cost accounting regulations to assist in developing its project cost accounting system.

An adequate accounting system should be in place prior to award. Under no circumstances will DOE cost share in the implementation costs of such a system.

PREAWARD ACCOUNTING SYSTEM INFORMATION

PROPOSER/SUBCONTRACTOR:

PROJECT TITLE:

PAGE ___ of ___

DOES THE ACCOUNTING SYSTEM PROVIDE FOR:		YES	NO
1.	Proper segregation of direct costs from indirect costs?		
2.	Identification and accumulation of direct costs by job order? Under a job order cost system, subsidiary cost records for each individual project are generally available.		
3.	A logical and consistent method for the allocation of indirect costs to intermediate and final cost objectives?		
4.	Accumulation of costs under general ledger control?		
5.	A timekeeping system that identifies employees' labor by intermediate or final cost objectives?		
6.	A labor distribution system that charges direct and indirect labor to the appropriate cost objectives?		
7.	Interim (at least monthly) determination of costs charged to a project through routine posting of books of account?		
8.	Exclusion from costs charged to Government projects of amounts which are not allowable pursuant to FAR Part 31, Contract Cost Principles and Procedures, or other contract provisions?		
9.	Identification of costs by project line item if required by the proposed award instrument?		
SIGNATURE:		DATE:	
NAME AND TITLE:			

APPENDIX P

ENERGY PROJECTIONS

NOTE: Information Extracted From A Draft Of The The National
Energy Strategy Report

DRAFT
National Energy Strategy

Revised NES No Further Policy Action Case

12/14/90

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Revised NES No Further Policy Action Case Notes:

- 1.) Includes revised Clean Air Act Amendments assumptions (11/29/90)**
- 2.) Includes revised vehicle efficiency, travel and transportation elasticity assumptions (12/14/90)**

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TABLE 1-1: REVISED NBS NO FURTHER ACTION CASE--
KEY ECONOMIC DATA AND ASSUMPTIONS

14-Dec

U.S.						
YEAR	GDP (BIL. 1989 DOLLARS)	POPULATION (MILLIONS)	OCCUPIED HOUSING STOCK (MILLIONS)	COMMERCIAL FLOOR SPACE (BIL. SQ. FT.)	INDUSTRIAL PRODUCTION INDEX (1985=100)	DISPOSABLE INCOME (BIL. 1989 DOLLARS)
HIST. 1960	2167	181	53.0	25.4	39.4	1420
1965	2641	194	58.0	32.7	53.4	1777
1970	3056	205	63.5	39.1	63.5	2170
1975	3409	216	72.5	45.6	68.6	2513
1980	4032	228	80.4	50.9	87.8	2881
1985	4578	239	88.6	57.8	100.0	3308
ESTI. 1987	4875	244	89.8	59.6	104.9	3482
PROJ. 1990	5331	251	93.9	62.9	114.0	3818
1995	6218	261	99.5	69.4	129.8	4110
2000	7172	269	105.5	79.5	152.9	4630
2005	8252	276	110.9	89.1	177.9	5268
2010	9367	283	116.1	98.0	204.1	5888
2015	10375	289	120.9	106.7	227.9	6498
2020	11357	294	125.1	115.2	251.7	7110
2025	12358	298	128.6	123.5	272.3	7732
2030	13376	301	131.7	131.5	291.9	8374

GROWTH RATES (% PER YEAR)					
1987-1990	1990-1995	1995-2000	2000-2005	2005-2010	2010-2015
3.0%	3.1%	2.9%	2.8%	2.6%	2.1%
1.0%	0.8%	0.6%	0.5%	0.5%	0.4%
1.5%	1.2%	1.2%	1.0%	0.9%	0.8%
2.8%	2.6%	2.8%	2.3%	1.9%	1.7%
2.3%	2.4%	2.8%	2.3%	1.7%	1.5%
2.0%	2.0%	2.0%	1.5%	1.4%	1.3%
1.7%	1.6%	1.4%	1.3%	1.3%	1.3%
1.6%	1.6%	1.6%	1.6%	1.6%	1.6%

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TABLE 1-2: REVISED WBS NO FURTHER ACTION CASE--U.S. FUEL PRICE SUMMARY BY SECTOR
(1989 DOLLARS PER MILLION BTU)

14-006

YEAR	RESOURCE PRICES				DELIVERED PRICES											
	WORLD OIL PRICE ^{a)} (1989 \$/MBL)	RE-FINER COST	WELL-HEAD CRUDE PRICE	MINE-MOUTH COAL PRICE	RESIDENTIAL SECTOR						COMMERCIAL SECTOR					
					DISTIL LATE	LI-QUID GASES	NAT-URAL GAS	ELEC-TRI-CITY	RESID. FUEL OIL	NAT-URAL GAS	LI-QUID GASES	DISTIL LATE	RESID. FUEL OIL	NAT-URAL GAS	ELEC-TRI-CITY	INDUSTRIAL SECTOR
1957-1960	9.89	1.70	0.20	0.69	4.19	4.11	3.88	27.57	3.58	2.35	2.86	26.55	3.69	2.33	3.63	1.00
1961	9.49	1.64	0.30	0.60	3.97	3.64	3.57	23.18	3.40	1.93	3.16	21.37	3.41	1.93	3.16	0.95
1962	9.09	1.57	0.42	0.69	4.19	6.30	3.19	19.70	3.15	1.51	2.63	19.70	2.17	1.38	3.38	1.12
1963	28.60	4.95	1.14	1.54	5.84	8.50	3.57	21.97	5.13	4.33	2.80	21.56	4.76	4.10	5.44	2.03
1964	49.78	8.59	2.35	1.30	10.36	11.66	5.31	23.18	9.57	6.55	4.86	23.70	8.18	5.48	7.73	3.70
1965	30.60	4.70	2.34	1.38	8.79	10.14	6.74	26.02	7.02	4.76	6.05	24.96	6.07	4.85	7.12	4.39
1966	18.16	3.06	1.62	1.14	5.97	8.13	5.57	22.40	4.31	3.20	4.79	21.06	4.41	2.65	5.55	2.84
1967	16.83	2.90	1.76	1.04	6.43	8.91	5.69	22.03	4.88	2.96	4.88	20.35	4.43	2.78	5.55	3.04
1968	26.30	3.50	2.27	1.07	7.07	9.38	6.31	22.03	5.57	3.52	5.47	20.35	5.10	3.34	6.01	3.63
1969	27.99	4.83	3.39	1.14	8.50	10.48	7.74	23.35	7.10	4.76	6.06	21.57	6.58	4.58	7.09	5.02
2000	33.41	5.76	4.33	1.16	9.50	11.99	8.53	24.62	8.17	5.63	7.62	22.74	7.62	5.46	7.68	5.70
2001	37.58	6.48	5.26	1.29	10.27	11.77	9.42	25.03	9.00	6.30	8.48	23.12	8.41	6.13	8.35	6.65
2002	40.64	7.01	6.40	1.36	10.84	12.64	10.55	25.35	9.61	6.80	9.57	23.42	9.00	6.62	9.20	7.74
2003	43.07	7.43	6.60	1.44	11.28	12.83	10.79	25.98	10.09	7.19	9.80	24.00	9.47	7.01	9.38	7.97
2004	45.34	7.82	7.15	1.49	11.71	13.29	11.39	26.17	10.54	7.56	10.38	24.17	9.91	7.38	9.83	8.35
2005	46.94	8.09	7.58	1.58	12.00	13.63	11.84	26.31	10.86	7.81	10.82	24.30	10.21	7.64	10.17	8.98
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2030																

(1989 DOLLARS PER PHYSICAL UNIT)

YEAR	DELIVERED PRICES			DELIVERED PRICES			DELIVERED PRICES			DELIVERED PRICES			DELIVERED PRICES			DELIVERED PRICES			DELIVERED PRICES			DELIVERED PRICES		
	PER BBL	PER MCF	PER TON	PER GAL	PER BBL	PER MCF	PER TON	PER GAL	PER BBL	PER MCF	PER TON	PER GAL	PER BBL	PER MCF	PER TON	PER GAL	PER BBL	PER MCF	PER TON	PER GAL	PER BBL	PER MCF	PER TON	PER GAL
ESTI- 1987	18.16	18.16	1.72	23.79	0.83	0.77	5.74	0.076	0.60	20.12	4.94	0.072	0.61	16.66	0.52	2.93	38.04	0.048	0.96	0.90	16.03	0.57		
PROJ- 1990-	16.83	16.83	1.81	23.07	0.89	0.84	5.87	0.075	0.68	18.62	5.03	0.069	0.61	17.48	0.52	3.14	37.30	0.048	0.98	0.97	17.48	0.58		
	20.30	20.30	2.33	23.68	0.98	0.89	6.50	0.075	0.77	22.14	5.64	0.069	0.71	21.00	0.57	3.75	39.00	0.048	1.07	1.06	21.00	0.67		
	27.99	27.99	3.69	25.14	1.18	0.99	7.98	0.080	0.98	29.93	7.07	0.074	0.91	28.80	0.67	5.18	41.22	0.051	1.25	1.25	28.80	0.89		
	33.41	33.41	4.46	25.71	1.32	1.05	8.79	0.084	1.13	35.42	7.86	0.078	1.06	34.30	0.72	5.97	42.31	0.053	1.38	1.38	34.30	1.04		
	37.58	37.58	5.41	26.49	1.42	1.11	9.71	0.085	1.25	39.64	8.74	0.079	1.17	38.52	0.79	6.05	45.77	0.054	1.48	1.49	38.52	1.16		
	40.64	40.64	6.59	30.00	1.50	1.19	10.88	0.086	1.33	42.75	9.87	0.080	1.25	41.63	0.87	7.98	48.92	0.055	1.55	1.57	41.63	1.25		
	43.07	43.07	6.80	31.84	1.56	1.21	11.13	0.089	1.40	45.20	10.11	0.082	1.31	44.08	0.89	8.22	52.05	0.056	1.61	1.63	44.08	1.32		
	45.34	45.34	7.36	32.93	1.62	1.26	11.74	0.089	1.46	47.51	10.70	0.082	1.37	46.39	0.93	8.81	56.56	0.057	1.67	1.68	46.39	1.38		
	46.94	46.94	7.80	34.86	1.67	1.29	12.21	0.090	1.51	49.13	11.15	0.083	1.42	48.01	0.96	9.26	61.32	0.057	1.71	1.72	48.01	1.43		
	2000																							
	2001																							
	2002																							
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2030																								

a) Projected delivered prices are resource prices plus estimated markups for processing and distribution.
b) U. S. average refiner acquisition cost of imported crude oil.

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**TABLE 1-3: REVISED RES NO FURTHER ACTION CASE--
U.S. FUEL PRICE SUMMARY BY SECTOR
(1969 DOLLARS PER MILLION BTU)**

YEAR	WORLD OIL PRICE ^(b) (1984 \$/BBL)	RESOURCE PRICES			UTILITY SECTOR					
		WELL- HEAD GAS PRICE	MINE- MOUTH COAL PRICE	DELIVERED PRICES				AVG. ELECT- RICITY PRICE		
				LIQUID FUELS	NAT- URAL GAS	STEAM COAL	WOC- LEAK			
HIST. 1960	9.89	1.70	0.28	0.59	n/a	n/a	n/a	n/a	21.0	
1965	9.49	1.64	0.38	0.60	n/a	n/a	n/a	n/a	18.2	
1970	9.09	1.57	0.62	0.69	1.27	0.84	0.93	0.54	14.5	
1975	20.68	4.95	1.14	1.54	4.27	1.60	1.74	0.51	18.4	
1980	49.78	8.59	2.55	1.38	6.41	3.25	2.00	0.63	21.0	
1985	50.69	4.70	2.54	1.38	5.00	3.92	1.89	0.81	21.6	
ESTI. 1987	18.16	3.86	1.62	1.14	3.31	2.43	1.63	0.77	20.3	
PROJ. 1990	16.83	2.90	1.76	1.04	2.96	2.52	1.58	0.81	18.9	
1995	20.30	3.50	2.27	1.07	3.56	3.10	1.69	0.71	18.7	
2000	27.99	4.03	3.59	1.14	4.90	4.48	1.77	0.62	19.8	
2005	33.41	5.76	4.33	1.16	5.85	5.23	1.80	0.61	20.9	
2010	37.58	6.48	5.26	1.29	6.57	6.08	1.97	0.60	21.2	
2015	40.64	7.01	6.40	1.36	7.11	7.21	2.07	0.60	21.5	
2020	43.07	7.43	6.60	1.44	7.53	7.50	2.18	0.60	22.0	
2025	45.34	7.82	7.15	1.49	7.93	8.12	2.25	0.60	22.2	
2030	46.94	8.09	7.58	1.59	8.21	8.61	2.37	0.60	22.3	

U.S. FUEL PRICE SUMMARY BY SECTOR

YEAR	PER BBL	PER MCF	PER TON	PER BBL	PER MCF	PER TON	PER CUM	CENTS /KWH
ESTI. 1987	18.16	1.72	23.79	19.01	2.48	34.72	46.2	6.9
PROJ. 1990	16.83	1.01	23.07	16.98	2.57	33.56	48.6	6.5
1995	20.30	2.33	23.68	20.47	3.17	36.01	42.9	6.4
2000	27.99	3.69	25.14	28.16	4.57	37.64	37.1	6.8
2005	33.41	4.46	25.71	33.60	5.33	38.42	36.5	7.1
2010	37.58	5.51	28.49	37.76	6.20	42.05	35.8	7.2
2015	40.64	6.59	30.00	40.84	7.36	44.00	35.8	7.3
2020	43.07	6.80	31.84	43.26	7.65	46.41	35.8	7.5
2025	45.34	7.36	32.93	45.54	8.29	47.86	35.8	7.6
2030	46.94	7.80	34.06	47.14	8.78	50.40	35.8	7.6

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TABLE 1-4: REVISED RES NO FURTHER ACTION CASE--PRIMARY ENERGY SUPPLIED TO THE U.S. ECONOMY (QUADS)

14-Dec

YEAR	INDIGENOUS ENERGY PRODUCTION						NET IMPORTS ^{a)}					ADJUSTMENTS ^{b)}					PRIMARY ENERGY SUP-PLIED TO THE ECONOMY TOTAL
	OIL	GAS	COAL	NUCLEAR	RENEW-ABLE	TOTAL	OIL	GAS	COAL	OTHER ^{c)}	TOTAL	STOCK CHANGES			TOTAL		
												OIL	GAS	COAL		OTHER ^{d)}	
Historical	16.4	12.7	10.6	0.0	3.0	42.9	3.6	0.2	-1.0	0.0	2.7	0.1	-0.1	0.1	-0.5	-0.4	45.1
1960	18.4	15.8	13.1	0.0	3.4	50.7	5.0	0.4	-1.4	0.0	4.1	0.0	-0.1	-0.0	-0.6	-0.7	54.0
1965	22.9	21.7	14.6	0.2	4.1	63.5	6.9	0.8	-1.9	0.0	5.8	-0.2	-0.4	-0.3	-0.5	-1.4	67.9
1970	20.1	19.6	15.0	1.9	4.7	61.3	12.5	0.9	-1.7	0.0	11.7	-0.3	-0.4	-0.7	0.3	-1.1	72.0
1975	20.5	19.9	18.6	2.7	5.6	67.4	13.5	1.0	-2.4	0.1	12.1	-0.3	0.0	-0.5	-0.2	-1.1	78.4
1980	21.2	16.9	19.3	4.2	6.5	68.1	9.0	0.9	-2.4	0.1	7.6	0.2	0.2	0.6	0.2	1.3	77.0
1985																	
ESTI-1987	19.8	16.6	20.1	4.9	6.8	68.3	12.2	0.9	-2.1	0.1	11.3	-0.1	0.0	-0.2	0.4	0.1	79.7
1990																	
PROJ-1990	17.9	17.8	21.6	5.9	6.8	69.9	16.1	1.4	-2.1	0.1	15.5	-	-	-	-	0.0	85.4
1995	15.5	19.1	22.9	6.0	7.3	70.9	20.7	2.5	-2.6	0.2	20.8	-	-	-	-	0.0	91.7
2000	14.5	21.3	26.3	6.2	8.3	76.5	23.6	3.1	-3.3	0.2	23.6	-	-	-	-	0.0	100.1
2005	13.5	20.6	31.0	6.4	9.9	81.3	27.3	3.5	-4.3	0.2	26.8	-	-	-	-	0.0	108.1
2010	13.1	20.7	37.3	6.4	11.3	88.8	30.9	3.5	-5.7	0.2	29.0	-	-	-	-	0.0	117.8
2015	12.6	21.3	42.4	4.5	12.6	93.3	34.5	3.5	-6.4	0.3	31.8	-	-	-	-	0.0	125.2
2020	11.4	20.2	48.3	5.5	14.3	97.8	37.3	3.1	-6.8	0.3	33.9	-	-	-	-	0.0	131.6
2025	10.1	19.5	53.6	1.8	16.0	101.0	40.2	3.2	-7.1	0.3	36.7	-	-	-	-	0.0	137.7
2030	8.6	17.6	59.6	0.4	17.9	104.1	42.7	3.3	-7.2	0.4	39.1	-	-	-	-	0.0	143.2

(PHYSICAL UNITS)

YEAR	TRILL'N CU. FT.		MILLION TONS		BILLION KWR		MILLION BDOE		MILLION BDOE		MILLION BPD		TRILL'N CU. FT.		MILLION TONS		MILLION BDOE		MILLION BDOE		MILLION BDOE	
	MILLION BPD	TRILL'N CU. FT.	MILLION TONS	TRILL'N CU. FT.	MILLION BDOE	TRILL'N CU. FT.	MILLION BDOE	MILLION BDOE	MILLION BDOE	MILLION BDOE	MILLION BDOE	MILLION BPD	TRILL'N CU. FT.	MILLION TONS	MILLION BDOE	MILLION BDOE	MILLION BDOE	MILLION BDOE	MILLION BDOE	MILLION BDOE	MILLION BDOE	
ESTI- 1987	9.9	16.3	919	462	3.2	32.3	5.7	0.9	-70	0.1	5.3	-0.0	-	-	-0.2	0.2	0.0	37.6				
PROJ- 1990	9.6	17.5	907	554	3.2	33.0	7.6	1.5	-92	0.0	7.3	-	-	-	-	-	-	40.3				
1995	8.7	18.8	1048	567	3.5	33.5	9.7	2.5	-97	0.1	9.8	-	-	-	-	-	-	43.3				
2000	8.3	20.8	1200	581	3.9	36.1	11.1	3.1	-126	0.1	11.2	-	-	-	-	-	-	47.3				
2005	7.9	20.2	1412	600	4.7	38.4	12.8	3.5	-164	0.1	12.6	-	-	-	-	-	-	51.1				
2010	7.7	20.3	1698	603	5.3	41.9	14.5	3.5	-217	0.1	13.7	-	-	-	-	-	-	55.6				
2015	7.5	20.9	1930	425	5.9	44.1	16.2	3.4	-243	0.1	15.0	-	-	-	-	-	-	59.1				
2020	6.8	19.8	2204	334	6.8	46.2	17.5	3.0	-257	0.1	16.0	-	-	-	-	-	-	62.2				
2025	6.1	19.1	2452	167	7.6	47.7	18.9	3.2	-269	0.2	17.3	-	-	-	-	-	-	65.1				
2030	5.4	17.3	2732	35	8.5	49.2	20.0	3.2	-272	0.2	18.5	-	-	-	-	-	-	67.7				

a) Including Strategic Petroleum Reserve.

b) Negative numbers indicate a reduction in energy supplied and positive numbers indicate an increase in energy supplied to the economy.

c) Includes transportation alcohol from natural gas and small amounts of coal coke and electricity.

d) A balancing item. Includes unaccounted for oil, gas and coal private stock changes, losses, gains, miscellaneous blending components, unaccounted for supply and anthracite shipped overseas to U.S. Armed Forces.

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TABLE 1-3: REVISED RES NO FURTHER ACTION CASE--ENERGY CONSUMED BY THE U.S. ECONOMY (QUADS)

14-Dec

PRIMARY ENERGY CONSUMED BY U.S. ECONOMY										ENERGY USED BY FINAL CONSUMERS EXCLUDING INPUTS TO UTILITIES AND STATISTICS									
YEAR	OIL	GAS	COAL	NUCLEAR	RENEW- ABLE	NET ALCOHOL IMPORTS	NET ELEC- TRICITY IMPORTS	TOTAL	ENERGY TRANS- FOR- MATION AND DISTRIBUTION LOSSES TOTAL	LIQUIDS	GASES	COAL SOLIDS	ELEC- TRICITY	RENEW- ABLE ^{a)}	TOTAL	RESI- DENTIAL	COM- MERCIAL	INDUS- TRIAL	TRANS- POR- TATION
HIST.																			
1960	19.9	12.4	9.6	0.0	3.0	0.0	0.0	45.1	-5.9	19.4	10.6	5.6	2.4	1.3	39.2	7.2	3.4	18.1	10.6
1965	23.3	15.0	11.6	0.0	3.4	0.0	0.0	54.0	-7.8	22.5	13.4	5.8	3.3	1.3	46.2	8.2	4.0	21.6	12.4
1970	29.5	21.8	12.3	0.2	4.1	0.0	0.0	67.9	-11.5	27.4	17.7	5.0	4.8	1.4	56.4	9.6	5.5	24.9	16.1
1975	32.7	19.9	12.7	1.9	4.7	0.0	0.0	72.0	-14.4	29.6	16.7	3.9	6.0	1.5	57.6	10.0	5.6	23.8	18.2
1980	34.2	20.4	15.4	2.7	5.6	0.0	0.1	78.4	-17.3	31.4	16.7	3.3	7.2	2.5	61.1	10.0	6.0	25.5	19.7
1985	30.9	17.8	17.5	4.2	6.5	0.0	0.1	77.0	-18.9	29.7	14.9	2.8	7.9	2.8	58.1	9.8	6.1	22.1	20.1
ESTI.																			
1987	32.6	17.2	18.0	4.9	6.8	0.0	0.1	79.7	-19.9	31.3	14.4	2.7	8.4	3.0	59.7	10.1	6.2	22.1	21.3
PROJ.																			
1990	34.4	19.2	19.0	5.9	6.8	0.0	0.1	85.4	-22.6	31.8	16.3	2.7	9.2	2.9	62.8	10.7	6.8	25.3	22.4
1995	36.2	21.0	20.4	6.0	7.3	0.0	0.2	91.0	-24.6	34.1	16.1	2.8	10.5	2.9	65.4	10.8	7.1	25.8	23.2
2000	38.1	23.7	23.0	6.2	8.3	0.0	0.2	99.4	-27.6	36.1	17.1	3.1	12.2	3.4	71.8	11.3	7.7	27.7	25.4
2005	40.8	23.4	26.6	6.4	9.9	0.0	0.2	107.4	-30.1	38.9	17.1	3.7	13.5	4.2	77.3	11.6	8.3	29.4	28.2
2010	44.0	23.5	31.6	6.4	11.3	0.0	0.2	117.1	-33.3	41.9	17.3	4.3	15.0	5.2	83.8	12.0	8.9	31.9	31.0
2015	47.1	24.1	36.0	4.5	12.6	0.0	0.3	124.5	-35.9	44.5	16.9	4.8	16.5	5.8	88.6	12.2	9.5	33.8	33.0
2020	48.7	22.7	41.5	3.5	14.3	0.0	0.3	131.0	-38.5	46.6	16.5	4.9	18.0	6.5	92.5	12.4	10.1	35.4	34.3
2025	50.3	22.1	46.5	1.8	16.0	0.0	0.3	137.1	-40.8	48.5	16.4	4.9	19.4	7.1	96.3	12.7	10.7	37.1	35.8
2030	51.3	20.3	52.4	0.4	17.9	0.0	0.4	142.6	-43.0	50.0	15.9	4.9	20.8	8.0	99.6	12.9	11.3	38.5	36.8

PHYSICAL UNITS

YEAR	MILLIO BPD	TRILL. CU. FT.	MILLIO TONS	BILLION KWH	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE	MILLIO BDOE
ESTI.																			
1987	16.3	16.8	838	2.3	3.2	0.0	41	37.6	-9.4	15.6	14.1	119	2455	1.4	28.2	4.8	2.9	10.5	10.0
PROJ.																			
1990	17.4	18.4	893	2.8	3.2	0.0	27	40.3	-10.7	16.5	16.0	120	2689	1.4	29.7	5.0	3.2	11.6	10.6
1995	18.4	20.6	951	2.8	3.5	0.0	47	43.0	-11.6	17.4	15.7	128	3090	1.4	31.4	5.1	3.4	12.2	11.0
2000	19.4	23.2	1074	2.9	3.9	0.0	59	47.0	-13.0	18.4	16.8	141	3563	1.6	33.9	5.3	3.7	13.1	12.0
2005	20.7	23.0	1248	3.0	4.7	0.0	65	50.7	-14.2	19.8	16.7	168	3955	2.0	36.5	5.5	3.9	13.9	13.3
2010	22.2	23.1	1481	3.0	5.3	0.0	68	55.3	-15.7	21.2	17.0	201	4397	2.5	39.6	5.7	4.2	15.1	14.7
2015	23.7	23.6	1687	2.1	5.9	0.0	76	58.8	-17.0	22.5	16.6	223	4847	2.8	41.8	5.8	4.5	16.0	15.6
2020	24.3	22.2	1947	1.7	6.8	0.0	85	61.9	-18.2	21.3	16.2	228	5280	3.0	43.7	5.9	4.8	16.7	16.3
2025	25.1	21.7	2184	0.8	7.6	0.0	95	64.8	-19.3	24.2	16.1	229	5682	3.4	45.5	6.0	5.1	17.5	16.9
2030	25.4	19.9	2460	0.2	8.5	0.0	107	67.4	-20.3	24.8	15.6	230	6086	3.8	47.0	6.1	5.4	18.2	17.4

a) Renewable central electric is included in electricity column.

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TABLE 1-6: REVISED WBS NO FURTHER ACTION CASE--ENERGY TRANSFORMATION IN THE U.S. ECONOMY (QUADS)

YEAR	ELECTRIC GENERATION										SYNTHETIC FUELS										ENERGY TRANS- FOR- MATION/ DISTRIB- UTION LOSSES TOTAL					
	ENERGY INPUT ^(a)						RENEW- ABLE	NUCLEAR	COAL	GAS	TOTAL	ENERGY TRANS- FOR- MATION/ DISTRIB- UTION LOSSES ^(b)	NET ELEC- TRICIT IMPORT	SALES	ENERGY INPUT			TRANS- FOR- MATION LOSSES TOTAL	SALES			TOTAL				
	OIL ^(a)	GAS	COAL	TOTAL	OIL	COAL									LIQUIDS	GAS	COAL		LIQUIDS	GAS			TOTAL			
						FOR SYNTH. GAS																		FOR SYNTH. LIQUIDS	FOR SYNTH. GAS	FOR SYNTH. LIQUIDS
HIST.																										
1960	0.6	1.8	4.2	8.2	0.0	1.7	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.9	
1965	0.7	2.4	5.8	11.0	0.0	2.1	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-7.8	
1970	2.1	4.1	7.2	16.3	0.2	2.6	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-11.5	
1975	3.2	3.2	8.8	20.3	1.9	3.2	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-14.4	
1980	2.6	3.8	12.1	24.4	2.7	3.1	0.1	7.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-17.4	
1985	1.1	3.2	14.5	26.7	4.2	3.7	0.1	7.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-18.9	
ESTI.																										
1987	1.3	2.9	15.2	28.1	4.9	3.8	0.1	8.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-20.0	
PROJ.																										
1990	1.7	2.7	16.4	30.6	5.9	3.9	0.1	9.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-22.6	
1995	1.9	5.0	17.4	34.9	6.0	4.4	0.2	10.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-24.6	
2000	1.9	6.7	19.8	39.4	6.2	4.8	0.2	12.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-27.6	
2005	1.8	6.5	22.9	43.2	6.4	5.7	0.2	13.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-30.1	
2010	1.9	6.4	27.2	47.9	6.4	6.1	0.2	15.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-33.3	
2015	2.4	7.4	31.1	52.1	4.5	6.7	0.3	16.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-35.9	
2020	2.0	6.3	36.5	56.1	3.5	7.9	0.3	18.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-38.5	
2025	1.7	5.8	41.5	59.7	1.8	8.9	0.3	19.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-40.8	
2030	1.1	4.5	47.4	63.3	0.4	9.9	0.4	20.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-43.0	

PHYSICAL UNITS

YEAR	MILLION TRILLS' CU. FT.			MILLION BBL		BILLION KWH		MILLION TONS		MILLION BBL		MILLION BBL		MILLION BBL		MILLION BBL		MILLION BBL		MILLION BBL	
	ESTI.	1987	1990	1995	2000	2005	2010	2015	2020	2025	2030	ESTI.	1987	1990	1995	2000	2005	2010	2015	2020	2030
ESTI.																					
1987	0.6	2.9	713	2.3	1.8	13.3	-9.4	41	2855	0.1	6	-	-	-	-	-	-	-	-	-	-
1990	0.8	2.6	769	2.8	1.8	14.5	-10.7	27	2689	0.0	3	-	-	-	-	-	-	-	-	-	-
1995	0.9	4.9	818	2.8	2.1	16.5	-11.6	47	3090	0.1	3	-	-	-	-	-	-	-	-	-	-
2000	0.9	6.6	928	2.9	2.3	18.6	-13.0	59	3563	0.1	6	-	-	-	-	-	-	-	-	-	-
2005	0.9	6.4	1074	3.0	2.7	20.4	-14.1	65	3955	0.1	6	-	-	-	-	-	-	-	-	-	-
2010	0.9	6.2	1275	3.0	2.9	22.6	-15.6	68	4397	0.1	6	-	-	-	-	-	-	-	-	-	-
2015	1.2	7.2	1459	2.1	3.2	24.6	-16.9	76	4847	0.1	6	-	-	-	-	-	-	-	-	-	-
2020	0.9	6.1	1714	1.7	3.7	26.5	-18.1	85	5280	0.1	6	-	-	-	-	-	-	-	-	-	-
2025	0.8	5.7	1949	0.8	4.2	28.2	-19.2	95	5882	0.1	6	-	-	-	-	-	-	-	-	-	-
2030	0.5	4.4	2225	0.2	4.7	29.9	-20.3	107	6086	0.1	6	-	-	-	-	-	-	-	-	-	-

a) Includes petroleum coke. b) Includes utility own use and transmission losses.
c) Includes energy inputs to non-utility generators who sell electricity to the utilities.

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TABLE 1-7: REVISED WBS NO FURTHER ACTION CASE--U.S. ENERGY CONSUMPTION BY THE RESIDENTIAL AND COMMERCIAL SECTORS
(QUADS)

14-Dec

RESIDENTIAL AND COMMERCIAL																		
YEAR	RESIDENTIAL					COMMERCIAL					RESIDENTIAL AND COMMERCIAL							
	LIQUIDS	GASES	COAL SOLIDS	ELECTRICITY ^{b)}	RENEWABLE	TOTAL	LIQUIDS	GASES	COAL SOLIDS	ELECTRICITY ^{b)}	RENEWABLE	TOTAL	LIQUIDS	GASES	COAL SOLIDS	ELECTRICITY ^{b)}	RENEWABLE	TOTAL
HIST.																		
1960	2.3	3.2	0.4	0.7	0.6	7.2	1.2	1.1	0.6	0.5	0.0	3.4	3.5	4.3	1.0	1.2	0.6	10.6
1965	2.5	4.0	0.3	1.0	0.5	8.2	1.4	1.5	0.4	0.8	0.0	4.0	3.9	5.5	0.6	1.8	0.5	12.2
1970	2.8	5.0	0.2	1.6	0.4	9.8	1.6	2.5	0.2	1.2	0.0	5.5	4.3	7.5	0.4	2.8	0.4	15.4
1975	2.5	5.0	0.1	2.0	0.4	10.0	1.3	2.6	0.1	1.6	0.0	5.6	3.8	7.6	0.2	3.6	0.5	15.6
1980	1.8	4.9	0.1	2.5	0.9	10.0	1.3	2.7	0.1	1.9	0.0	6.0	3.0	7.5	0.2	4.4	0.9	16.0
1985	1.5	4.6	0.1	2.7	1.0	9.8	1.0	2.5	0.1	2.4	0.1	6.1	2.6	7.1	0.2	5.1	1.0	15.9
ESTI.																		
1987	1.5	4.6	0.1	3.0	1.0	10.1	1.0	2.4	0.1	2.6	0.1	6.2	2.5	7.0	0.2	5.5	1.1	16.3
PROJ.																		
1990	1.6	4.9	0.1	3.2	0.9	10.7	1.0	2.8	0.1	2.9	0.1	6.9	2.6	7.7	0.2	6.1	1.0	17.5
1995	1.3	4.7	0.1	3.6	1.0	10.8	0.9	2.6	0.1	3.4	0.1	7.1	2.3	7.3	0.2	7.0	1.1	17.9
2000	1.2	4.9	0.1	4.0	1.1	11.3	0.9	2.7	0.1	3.9	0.1	7.7	2.1	7.6	0.2	7.9	1.2	19.0
2005	1.1	4.9	0.1	4.3	1.2	11.6	0.9	2.8	0.1	4.4	0.1	8.3	1.9	7.6	0.2	8.8	1.4	19.9
2010	1.0	4.9	0.1	4.6	1.4	12.0	0.8	2.8	0.1	5.0	0.2	8.9	1.8	7.7	0.2	9.6	1.5	20.8
2015	0.9	4.7	0.1	5.0	1.5	12.2	0.8	2.8	0.1	5.5	0.2	9.5	1.7	7.6	0.2	10.5	1.7	21.7
2020	0.9	4.6	0.1	5.3	1.6	12.4	0.8	2.9	0.0	6.1	0.3	10.1	1.6	7.5	0.2	11.4	1.9	22.5
2025	0.8	4.5	0.1	5.5	1.7	12.7	0.8	3.0	0.0	6.6	0.3	10.7	1.6	7.5	0.2	12.2	2.0	23.4
2030	0.8	4.4	0.1	5.8	1.8	12.9	0.8	3.0	0.0	7.2	0.4	11.3	1.5	7.4	0.1	13.0	2.2	24.3

PHYSICAL UNITS

YEAR	TRILL'N CU. FT.		MILLION TONS		BILLION KWH		MILLION BDOE		TRILL'N CU. FT.		MILLION TONS		BILLION KWH		MILLION BDOE	
	MILLION BPD								MILLION BPD							
ESTI. 1987	0.8	4.5	2.9	864	0.5	4.8	0.5	2.4	4.2	756	0.1	2.9	1.3	6.8	7.1	1620
PROJ. 1990	0.8	4.8	3.3	926	0.4	5.0	0.5	2.7	4.2	850	0.0	3.2	1.4	7.5	8.3	1776
1995	0.7	4.6	5.5	1052	0.5	5.1	0.5	2.6	3.3	992	0.0	3.4	1.2	7.2	8.8	2045
2000	0.6	4.8	5.3	1170	0.5	5.3	0.5	2.7	3.0	1153	0.1	3.7	1.1	7.5	8.3	2323
2005	0.6	4.8	5.1	1268	0.6	5.5	0.4	2.7	2.6	1303	0.1	3.9	1.0	7.5	7.8	2572
2010	0.5	4.8	5.0	1360	0.6	5.7	0.4	2.8	2.3	1462	0.1	4.2	0.9	7.5	7.3	2822
2015	0.5	4.6	4.8	1457	0.7	5.8	0.4	2.8	2.1	1626	0.1	4.5	0.9	7.4	7.0	3083
2020	0.5	4.5	4.8	1544	0.8	5.9	0.4	2.8	1.9	1784	0.1	4.8	0.9	7.3	6.7	3328
2025	0.4	4.4	4.7	1621	0.8	6.0	0.4	2.9	1.8	1941	0.2	5.1	0.8	7.3	6.4	3561
2030	0.4	4.3	4.6	1708	0.9	6.1	0.4	2.9	1.6	2101	0.2	5.4	0.8	7.2	6.2	3808

a) Includes distillate, liquified petroleum gas, and kerosene.
b) Excludes generation, transmission and distribution losses.

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TABLE 1-8: REVISED NBS NO FURTHER ACTION CASE--0.8. ENERGY CONSUMPTION BY THE INDUSTRIAL SECTOR (QUADS)

14-DOE

YEAR	INDUSTRIAL									
	ENERGY USE (Excluding Non-Energy Feedstocks)					NON-ENERGY USE ^{b)}				
	LIQUIDS	GASES	COAL SOLIDS	ELECTRICITY	RENEWABLE	TOTAL	LIQUIDS		GASES	NET COAL
							ASPHALT	OTHER		
HIST.										
1960	4.0	5.6	2.3	1.1	0.7	13.7	0.7	1.0	0.4	2.2
1965	4.4	7.1	2.5	1.5	0.9	16.3	0.9	1.5	0.3	2.6
1970	4.7	8.8	2.1	2.0	1.0	18.6	1.1	2.0	0.7	2.6
1975	4.8	7.9	1.5	2.4	1.1	17.7	1.0	2.3	0.7	2.2
1980	5.5	7.8	1.4	2.8	1.6	19.1	1.0	3.1	0.6	1.8
1985	3.8	6.4	1.7	2.8	1.7	16.4	1.0	2.9	0.7	1.1
ESTI.										
1987	4.1	6.2	1.5	2.9	1.6	16.5	1.1	2.8	0.7	1.1
PROJ.										
1990	3.6	7.1	1.7	3.1	1.8	17.3	1.2	3.9	1.1	1.1
1995	4.2	7.3	1.6	3.6	1.8	18.4	1.2	4.0	1.1	1.1
2000	4.3	7.8	1.8	4.2	2.1	20.1	1.3	4.1	1.1	1.1
2005	4.5	7.6	2.4	4.7	2.4	21.6	1.3	4.3	1.1	1.0
2010	4.8	7.7	3.2	5.4	2.9	23.9	1.4	4.5	1.2	1.0
2015	5.3	7.4	3.7	6.0	3.3	25.6	1.4	4.8	1.2	0.9
2020	5.9	7.1	3.9	6.6	3.6	27.1	1.4	4.9	1.1	0.8
2025	6.5	7.0	4.0	7.2	4.0	28.8	1.4	5.0	1.1	0.7
2030	7.3	6.7	4.1	7.7	4.4	30.3	1.4	5.2	1.0	0.6
YEAR	ENERGY AND NON-ENERGY USE									
	LIQUIDS	GASES	COAL SOLIDS	ELECTRICITY	RENEWABLE	TOTAL	LIQUIDS	GASES	COAL SOLIDS	ELECTRICITY
1960	5.7	6.0	4.6	1.1	0.7	18.1	5.7	6.0	4.6	1.1
1965	6.8	7.4	5.1	1.5	0.9	21.6	6.8	7.4	5.1	1.5
1970	7.8	9.5	4.7	2.0	1.0	24.9	7.8	9.5	4.7	2.0
1975	8.2	8.6	3.7	2.4	1.1	23.8	8.2	8.6	3.7	2.4
1980	9.5	8.4	3.2	2.8	1.6	23.5	9.5	8.4	3.2	2.8
1985	7.7	7.1	2.8	2.8	1.7	22.1	7.7	7.1	2.8	2.8
1987	8.1	6.9	2.5	2.9	1.8	22.1	8.1	6.9	2.5	2.9
1990	8.7	6.2	2.8	3.1	1.8	24.6	8.7	6.2	2.8	3.1
1995	9.5	8.4	2.6	3.6	1.8	25.8	9.5	8.4	2.6	3.6
2000	9.6	8.9	2.9	4.2	2.1	27.7	9.6	8.9	2.9	4.2
2005	10.0	8.8	3.5	4.7	2.4	29.4	10.0	8.8	3.5	4.7
2010	10.7	8.8	4.2	5.4	2.9	31.9	10.7	8.8	4.2	5.4
2015	11.4	8.5	4.6	6.0	3.3	33.8	11.4	8.5	4.6	6.0
2020	12.1	8.3	4.7	6.6	3.6	35.4	12.1	8.3	4.7	6.6
2025	13.0	8.2	4.7	7.2	4.0	37.1	13.0	8.2	4.7	7.2
2030	13.8	7.8	4.7	7.7	4.4	38.5	13.8	7.8	4.7	7.7

PHYSICAL UNITS

YEAR	PHYSICAL UNITS									
	ENERGY USE (Excluding Non-Energy Feedstocks)					NON-ENERGY USE ^{b)}				
	MILLION BPD	TRILL'N CU. FT.	MILLION TONS	BILLION KWH	MILLION BDOE	TOTAL	LIQUIDS		GASES	NET COAL
							ASPHALT	OTHER		
ESTI.										
1987	2.1	6.1	62	835	6.6	7.6	0.5	1.4	0.7	44
PROJ.										
1990	1.6	7.0	71	908	0.9	8.2	0.5	1.9	1.1	46
1995	2.1	7.1	66	1042	0.8	8.7	0.5	2.0	1.1	44
2000	2.1	7.6	76	1236	1.0	9.5	0.5	2.6	1.1	45
2005	2.2	7.5	102	1378	1.1	10.2	0.5	2.1	1.1	43
2010	2.4	7.5	134	1569	1.4	11.3	0.6	2.2	1.1	40
2015	2.6	7.2	154	1759	1.5	12.1	0.6	2.4	1.1	38
2020	2.9	7.0	161	1946	1.7	12.8	0.6	2.4	1.1	35
2025	3.3	6.9	166	2114	1.9	13.6	0.6	2.5	1.1	30
2030	3.6	6.6	171	2270	2.1	14.3	0.6	2.6	1.0	25
ESTI.										
1987	2.1	6.1	62	835	6.6	7.6	0.5	1.4	0.7	44
PROJ.										
1990	1.6	7.0	71	908	0.9	8.2	0.5	1.9	1.1	46
1995	2.1	7.1	66	1042	0.8	8.7	0.5	2.0	1.1	44
2000	2.1	7.6	76	1236	1.0	9.5	0.5	2.6	1.1	45
2005	2.2	7.5	102	1378	1.1	10.2	0.5	2.1	1.1	43
2010	2.4	7.5	134	1569	1.4	11.3	0.6	2.2	1.1	40
2015	2.6	7.2	154	1759	1.5	12.1	0.6	2.4	1.1	38
2020	2.9	7.0	161	1946	1.7	12.8	0.6	2.4	1.1	35
2025	3.3	6.9	166	2114	1.9	13.6	0.6	2.5	1.1	30
2030	3.6	6.6	171	2270	2.1	14.3	0.6	2.6	1.0	25

a) Excludes generation, transmission and distribution losses.

b) Energy resources utilized in the manufacture of non-energy materials (asphalt, fertilizers, etc.).

c) Biomass/waste used by cogenerators selling electricity to utilities are included in Table 3-13.

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TABLE 1-9: REVENUE HAS NO FURTHER ACTION CASE--0.5. ENERGY CONSUMPTION BY THE TRANSPORTATION SECTOR (QUADS) 14-Dec

YEAR	TRANSPORTATION									
	LIQUIDS					GASES	COAL SOLIDS	ELECTRICITY b)	RENEWABLES	TOTAL
	GASOLINE	DIESEL	JETFUEL	IMPORTED METHANOL	OTHER a)					
1960	7.5	0.9	0.7	0.0	1.0	0.4	0.1	0.0	0.0	10.6
1965	8.6	1.1	1.2	0.0	1.0	0.5	0.0	0.0	0.0	12.4
1970	10.8	1.6	2.0	0.0	0.9	0.7	0.0	0.0	0.0	16.1
1975	12.6	2.1	2.0	0.0	0.9	0.6	0.0	0.0	0.0	18.2
1980	12.4	2.8	2.2	0.0	1.6	0.7	0.0	0.0	0.0	19.7
1985	12.8	3.2	2.5	0.0	1.0	0.5	0.0	0.0	0.1	20.1
ESTI. 1987	13.4	3.4	2.8	0.0	1.1	0.5	0.0	0.0	0.1	21.3
PROJ. 1990	13.9	3.8	3.1	0.0	0.9	0.7	0.0	0.0	0.1	22.4
1995	13.6	4.1	3.5	0.0	1.1	0.7	0.0	0.0	0.1	23.2
2000	14.5	4.6	4.0	0.0	1.2	0.7	0.0	0.0	0.2	25.4
2005	15.7	5.2	4.7	0.0	1.4	0.7	0.0	0.0	0.5	28.2
2010	17.0	5.8	5.3	0.0	1.5	0.7	0.0	0.0	0.8	31.0
2015	17.7	6.5	5.7	0.0	1.6	0.7	0.0	0.0	0.8	33.0
2020	18.1	6.9	6.1	0.0	1.7	0.7	0.0	0.0	0.9	34.5
2025	18.4	7.4	6.6	0.0	1.8	0.8	0.0	0.0	1.0	35.8
2030	18.1	7.9	6.9	0.0	1.8	0.9	0.0	0.0	1.2	36.8

YEAR	PHYSICAL UNITS							
	MILLION BPD	MILLION BPD	MILLION BPD	MILLION BPD	MILLION BPD	TRILLION CU. FT.	MILLION TONS	BILLION KWH
ESTI. 1987	7.0	1.6	1.4	0.0	0.6	0.5	0.0	3
PROJ. 1990	7.2	1.8	1.5	0.0	0.5	0.7	0.0	0
1995	7.1	1.9	1.8	0.0	0.6	0.7	0.0	4
2000	7.6	2.2	2.0	0.0	0.6	0.7	0.0	4
2005	8.2	2.4	2.4	0.0	0.7	0.7	0.0	5
2010	8.8	2.7	2.6	0.0	0.7	0.7	0.0	6
2015	9.2	3.0	2.9	0.0	0.8	0.7	0.0	6
2020	9.5	3.3	3.1	0.0	0.8	0.7	0.0	6
2025	9.6	3.5	3.3	0.0	0.9	0.8	0.0	7
2030	9.5	3.7	3.5	0.0	0.9	0.9	0.0	8

a) Includes residual and non-highway distillate fuels.

b) Excludes generation, transmission and distribution losses.

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TABLE 1-10: REVISED NIS NO FURTHER ACTION CASE--U.S. LIQUIDS SUPPLY AND TRANSFORMATION
(QUADS)

14-Dec

YEAR	INDIGENOUS OIL PRODUCTION							ADDITIONAL SOURCES			PRIMARY OIL TOTAL	TRANSFORMATION			LIQUIDS USED BY FINAL CONSUMERS TOTAL
	CONVENTIONAL OIL		ENHANCED OIL RECOVERY	TAR SANDS	SHALE OIL	NATURAL GAS LIQUIDS	TOTAL	NET IMPORTS	STOCK CHANGES	OTHER ^c		TO ELEC-TRICITY	SYNTHETICS		
	CONTINENTAL U.S. ^{a)}	NORTH ALASKA											TO GAS	FROM COAL	
HIST.															
1960	14.9	0.0	0.0	0.0	0.0	1.5	16.4	3.6	0.1	-0.2	19.9	-0.6	0.0	0.0	19.4
1965	16.5	0.1	0.0	0.0	0.0	1.9	18.4	5.0	0.0	-0.2	23.3	-0.7	0.0	0.0	22.5
1970	19.9	0.5	0.0	0.0	0.0	2.5	22.9	6.9	-0.2	-0.1	29.5	-2.1	0.0	0.0	27.4
1975	17.3	0.4	0.0	0.0	0.0	2.4	20.1	12.5	-0.3	0.5	32.7	-3.2	0.0	0.0	29.6
1980	14.0	3.4	0.0	0.0	0.0	2.3	20.5	13.5	-0.3	0.5	34.2	-2.6	-0.2	0.0	31.4
1985	14.2	3.9	1.0	0.0	0.0	2.2	21.2	9.0	0.2	0.5	30.9	-1.1	-0.1	0.0	29.7
ESTI.															
1987	12.4	4.2	1.0	0.0	0.0	2.2	19.8	12.2	-0.1	0.7	32.6	-1.3	-0.1	0.0	31.3
PROJ.															
1990	10.1	4.0	1.0	0.0	0.0	2.4	17.5	16.1	-	-	33.6	-1.7	-0.1	0.0	31.8
1995	9.5	2.4	1.2	0.0	0.0	2.5	15.5	20.7	-	-	36.2	-1.9	-0.1	0.0	34.1
2000	9.0	1.6	1.3	0.0	0.0	2.7	14.5	23.6	-	-	38.1	-1.9	-0.1	0.0	36.1
2005	8.2	1.1	1.6	0.0	0.0	2.5	13.5	27.3	-	-	40.8	-1.8	-0.1	0.0	38.9
2010	7.3	1.4	2.0	0.0	0.0	2.4	13.1	30.9	-	-	44.0	-1.9	-0.1	0.0	41.9
2015	6.4	1.4	2.1	0.4	0.0	2.2	12.6	34.5	-	-	47.1	-2.4	-0.1	0.0	44.5
2020	5.5	1.2	2.0	1.2	0.0	1.5	11.4	37.3	-	-	48.7	-2.0	-0.1	0.0	46.6
2025	4.1	0.8	1.9	2.0	0.0	1.2	10.1	40.2	-	-	50.3	-1.7	-0.1	0.0	48.5
2030	3.0	0.5	1.8	2.5	0.0	0.9	8.6	42.7	-	-	51.3	-1.1	-0.1	0.0	50.0

PHYSICAL UNITS

YEAR	MILLION BPD									
	ESTI. 1987	PROJ. 1990	1995	2000	2005	2010	2015	2020	2025	2030
5.9	2.0	0.5	0.0	0.0	0.0	1.6	9.9	5.7	-0.0	0.7
15.6										
16.5										
17.4										
18.4										
19.8										
21.2										
22.5										
23.3										
24.2										
24.8										

a) Includes South Alaskan oil.

b) Includes tar sands and shale oil.

c) A balancing item. Includes unaccounted for private stock changes, losses, gains, miscellaneous blending components and unaccounted for supply Accounts for refinery gains only in the physical units table, 1984-2010.

d) Primary oil plus synthetic oil from coal. Includes oil used to produce electricity and synthetic gas.

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TABLE 1-11: REVISED NIS NO FURTHER ACTION CASE--U.S. GASES SUPPLY AND TRANSFORMATION
(QUADS)

14-Dec

YEAR	INDIGENOUS PRODUCTION			ADDITIONAL SOURCES				PRIMARY GAS TOTAL	TRANSFORMATION				GAS USED BY FINAL CONSUMERS TOTAL	TOTAL GAS SUPPLIED TO U.S. ECONOMY
	CONVENTIONAL GAS			NET IMPORTS		STOCK CHANGES	OTHER		TO ELECTRICITY	SYNTHETICS		TOTAL		
	CONTINENTAL U.S.	MORTH ALASKA	TOTAL	FROM OIL	FROM COAL									
										PIPE-LINE	LNG			
HIST.	12.7	0.0	12.7	0.2	0.0	-0.1	-0.3	12.4	-1.8	0.0	0.0	0.0	10.6	12.4
1960	15.8	0.0	15.8	0.4	0.0	-0.1	-0.3	15.8	-2.4	0.0	0.0	0.0	13.4	15.8
1965	21.7	0.0	21.7	0.8	-0.0	-0.4	-0.2	21.8	-4.1	0.0	0.0	0.0	17.7	21.8
1970	19.6	0.0	19.6	1.0	-0.1	-0.4	-0.2	19.9	-3.2	0.0	0.0	0.0	16.7	19.9
1975	19.9	0.0	19.9	0.9	0.0	0.0	-0.5	20.4	-3.8	0.2	0.0	0.2	16.7	20.6
1980	16.9	0.0	16.9	1.0	-0.0	0.2	-0.3	17.6	-3.2	0.1	0.1	0.2	14.9	18.1
1985	16.6	-	16.6	0.9	0.0	0.0	-0.5	17.2	-2.9	0.1	0.1	0.2	14.4	17.4
ESTI.	17.9	0.0	17.9	1.4	0.1	-	-0.6	18.8	-2.7	0.2	0.0	0.2	16.3	19.0
1990	19.1	0.0	19.1	2.1	0.4	-	-0.7	21.0	-5.0	0.1	0.1	0.1	16.1	21.1
1995	21.3	0.0	21.3	2.1	1.0	-	-0.7	23.7	-6.7	0.1	0.1	0.1	17.1	23.8
2000	20.1	0.5	20.6	2.4	1.2	-	-0.7	23.4	-6.5	0.1	0.1	0.1	17.1	23.6
2005	19.4	1.3	20.7	2.1	1.5	-	-0.7	23.5	-6.4	0.1	0.1	0.1	17.3	23.7
2010	20.1	1.3	21.3	1.5	2.0	-	-0.7	24.1	-7.4	0.1	0.1	0.1	16.9	24.3
2015	19.0	1.2	20.2	1.0	2.1	-	-0.7	22.7	-6.3	0.1	0.1	0.1	16.5	22.8
2020	18.8	0.7	19.5	0.9	2.3	-	-0.6	22.1	-5.8	0.1	0.1	0.1	16.4	22.2
2025	17.2	0.4	17.6	0.8	2.3	-	-0.6	20.3	-4.5	0.1	0.1	0.1	15.9	20.4

PHYSICAL UNITS

YEAR	TRILLION CU. FT.													TCF
	16.3	-	16.3	0.9	0.0	-	-0.4	16.8	-2.9	0.1	0.1	0.2	16.1	17.0
ESTI. 1987														
PROJ.														
1990	17.5	-	17.5	1.4	0.1	-	-0.6	18.4	-2.6	0.2	0.0	0.2	16.0	18.6
1995	18.8	-	18.8	2.1	0.4	-	-0.6	20.6	-4.9	0.1	0.1	0.1	15.7	20.7
2000	20.8	-	20.8	2.1	1.0	-	-0.7	23.2	-6.6	0.1	0.1	0.1	16.8	23.4
2005	19.7	0.5	20.2	2.3	1.1	-	-0.7	23.0	-6.4	0.1	0.1	0.1	16.7	23.1
2010	19.0	1.2	20.3	2.0	1.4	-	-0.7	23.1	-6.2	0.1	0.1	0.1	17.0	23.2
2015	19.7	1.2	20.9	1.5	1.9	-	-0.7	23.6	-7.2	0.1	0.1	0.1	16.6	23.8
2020	18.6	1.2	19.8	1.0	2.0	-	-0.6	22.2	-6.1	0.1	0.1	0.1	16.2	22.3
2025	18.4	0.7	19.1	0.9	2.3	-	-0.6	21.7	-5.7	0.1	0.1	0.1	16.1	21.8
2030	16.8	0.4	17.3	0.8	2.5	-	-0.6	19.9	-4.4	0.1	0.1	0.1	15.6	20.0

a) Synthetic gas is included in primary gas supply, 1960-1980.

b) Includes South Alaskan and unconventional gas.

c) A balancing item. Includes unaccounted for stock changes, losses, gains and supply.

d) Primary gas plus synthetic gas from oil and coal. Includes gas used to produce electricity.

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TABLE 1-12: REVISED MMS NO FURTHER ACTION CASE--U.S. COAL SOLIDS SUPPLY AND TRANSFORMATION
(QUADS)

14-Dec

YEAR	INDIGENOUS PRODUCTION	ADDITIONAL SOURCES			PRIMARY COAL TOTAL	TRANSFORMATION		COAL SOLIDS USED BY FINAL CONSUMERS TOTAL	TOTAL COAL SOLIDS SUPPLIED TO U.S. ECONOMY ^{b)}
		NET IMPORTS	STOCK CHANGES	OTHER ^{a)}		TO ELECTRICITY	TO SYNTHETIC FUELS		
HIST. 1960	10.8	-1.0	0.1	-0.0	9.8	-4.2	0.0	5.6	9.8
1965	13.1	-1.4	-0.0	-0.1	11.6	-5.8	0.0	5.8	11.6
1970	14.6	-1.9	-0.3	-0.2	12.3	-7.2	0.0	5.0	12.3
1975	15.0	-1.7	-0.7	0.1	12.7	-8.8	0.0	3.9	12.7
1980	18.6	-2.4	-0.5	-0.3	15.4	-12.1	0.0	3.3	15.4
1985	19.3	-2.4	0.6	-0.1	17.5	-14.5	-0.1	2.8	17.5
ESTI. 1987	20.1	-2.1	-0.2	0.1	18.0	-15.2	-0.1	2.7	18.0
PROJ. 1990	21.6	-2.4	-	-	19.0	-16.4	-0.1	2.7	19.0
1995	22.9	-2.6	-	-	20.4	-17.4	-0.1	2.8	20.4
2000	26.3	-3.3	-	-	23.0	-19.8	-0.1	3.1	23.0
2005	31.0	-4.3	-	-	26.6	-22.9	-0.1	3.7	26.6
2010	37.3	-5.7	-	-	31.6	-27.2	-0.1	4.3	31.6
2015	42.4	-6.4	-	-	36.0	-31.1	-0.1	4.8	36.0
2020	48.3	-6.8	-	-	41.5	-36.5	-0.1	4.9	41.5
2025	53.6	-7.1	-	-	46.5	-41.5	-0.1	4.9	46.5
2030	59.6	-7.2	-	-	52.4	-47.4	-0.1	4.9	52.4

PHYSICAL UNITS

YEAR	MILLION TONS					
	INDIGENOUS PRODUCTION	NET IMPORTS	STOCK CHANGES	OTHER ^{a)}	PRIMARY COAL TOTAL	TRANSFORMATION
ESTI. 1987	919	-78	-9	6	838	-6
PROJ. 1990	987	-92	-	-	893	-4
1995	1048	-97	-	-	951	-4
2000	1200	-126	-	-	1074	-5
2005	1412	-164	-	-	1248	-5
2010	1698	-217	-	-	1481	-5
2015	1930	-243	-	-	1687	-5
2020	2204	-257	-	-	1947	-5
2025	2452	-269	-	-	2184	-5
2030	2732	-272	-	-	2460	-6

a) A balancing item. Includes unaccounted for private stock changes, losses, unaccounted for supply and anthracite shipped overseas to U.S. Armed Forces.

b) Includes coal used to produce electricity and synthetic fuels.

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TABLE 1-13: REVISED OPTIONS PACKAGE B CASE--U.S. RENEWABLE ENERGY PRODUCTION AND CONSUMPTION (QUADS)

14-Dec

INDIGENOUS PRODUCTION																				
YEAR	ELECTRIC GENERATION INPUTS a)										DISPERSED							PRIMARY RENEW-ABLES TOTAL	IMPORTS TO KLAS-TRIC GENER-ATION ^{a)}	RENEW-ABLES USED BY FINAL CON-SUMERS TOTAL
	HYDRO.	GEO-THERMAL	BIOMASS /WOOD	NON-SOLID WASTE	SOLAR THERMAL	PHOTO-VOLTAIC	WIND	TOTAL	BIOMASS			ACTIVE/PASSIVE SOLAR	GEO-THERMAL	PHOTO-VOLTAIC	WIND	TOTAL				
									WOOD	OTHER ^{b)}										
Hist.-1960	1.7	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.0	-1.7	1.3
1965	2.1	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.4	-2.1	1.3
1970	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.6	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	4.1	-2.6	1.4
1975	3.2	0.0	0.0	0.0	0.0	0.0	0.0	3.2	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	4.7	-3.2	1.5
1980	3.0	0.1	0.0	0.0	0.0	0.0	0.0	3.1	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	5.6	-3.1	2.5
1985	3.3	0.3	0.0	0.1	0.0	0.0	0.0	3.7	2.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.8	6.5	-3.7	2.8
ESTI-1987	3.4	0.3	0.0	0.1	0.0	0.0	0.0	3.8	2.6	0.2	0.1	0.0	0.0	0.0	0.0	0.0	3.0	6.8	-3.8	3.0
PROJ.-1990	3.2	0.3	0.2	0.2	0.0	0.0	0.1	3.9	2.6	0.2	0.1	0.1	0.0	0.0	0.0	0.0	2.9	6.8	-3.9	2.9
1995	3.6	0.3	0.2	0.6	0.0	0.0	0.1	4.9	2.5	0.5	0.1	0.1	0.0	0.0	0.0	0.0	3.3	8.2	-4.9	3.3
2000	3.8	0.4	0.2	0.9	0.0	0.0	0.1	5.4	2.8	3.9	0.1	0.1	0.1	0.1	0.1	0.1	7.0	12.5	-5.4	7.0
2005	4.0	0.5	0.3	2.2	0.0	0.0	0.1	7.1	3.2	7.8	0.2	0.1	0.1	0.1	0.1	0.1	11.5	18.6	-7.1	11.5
2010	4.2	0.5	0.3	3.1	0.0	0.0	0.1	8.2	3.5	9.7	0.2	0.2	0.2	0.1	0.2	0.2	13.9	22.1	-8.2	13.9
2015	4.4	0.7	0.3	3.8	0.0	0.0	0.2	9.4	3.8	7.9	0.2	0.2	0.2	0.2	0.2	0.2	12.4	21.8	-9.4	12.4
2020	4.5	1.5	0.3	4.6	0.1	0.0	0.3	11.3	4.1	7.1	0.2	0.2	0.3	0.2	0.2	0.2	12.0	23.3	-11.3	12.0
2025	4.6	1.8	0.4	5.2	0.4	0.0	0.5	12.9	4.5	8.4	0.2	0.2	0.4	0.2	0.2	0.2	13.9	26.8	-12.9	13.9
2030	4.7	1.9	0.5	5.8	0.6	0.1	0.6	14.3	4.9	8.3	0.3	0.3	0.5	0.3	0.3	0.3	14.4	28.8	-14.3	14.4

PHYSICAL UNITS

YEAR	MILLION BDOE																	
	1.6	0.1	0.0	0.0	0.0	0.0	0.0	1.8	1.2	0.1	0.0	0.0	0.0	0.0	1.4	3.2	-1.8	1.3
ESTI- 1987																		
PROJ- 1990	1.5	0.1	0.1	0.1	0.0	0.0	0.0	1.8	1.2	0.1	0.1	0.0	0.0	0.0	1.4	3.2	-1.8	1.4
1995	1.7	0.2	0.1	0.3	0.0	0.0	0.0	2.3	1.2	0.3	0.1	0.0	0.0	0.0	1.6	3.9	-2.3	1.6
2000	1.8	0.2	0.1	0.4	0.0	0.0	0.0	2.6	1.3	1.8	0.1	0.0	0.0	0.0	3.3	5.9	-2.6	3.3
2005	1.9	0.2	0.1	1.0	0.0	0.0	0.0	3.3	1.5	3.7	0.1	0.1	0.0	0.0	5.4	8.8	-3.3	5.4
2010	2.0	0.3	0.1	1.5	0.0	0.0	0.0	3.9	1.7	4.6	0.1	0.1	0.1	0.1	6.5	10.4	-3.9	6.5
2015	2.1	0.3	0.1	1.8	0.0	0.0	0.0	4.4	1.8	3.7	0.1	0.1	0.1	0.1	5.9	10.3	-4.4	5.9
2020	2.1	0.7	0.2	2.2	0.0	0.0	0.0	5.3	1.9	3.3	0.1	0.1	0.1	0.1	5.7	11.0	-5.3	5.7
2025	2.2	0.9	0.2	2.5	0.2	0.0	0.0	6.1	2.1	4.0	0.1	0.2	0.1	0.1	6.6	12.7	-6.1	6.6
2030	2.2	0.9	0.2	2.7	0.3	0.0	0.0	6.8	2.3	3.9	0.1	0.2	0.1	0.1	6.8	13.6	-6.8	6.8

a) Includes energy inputs to non-utility generators who sell electricity to the utilities.

b) Includes sewer and landfill gas, agricultural waste, and biomass alcohol inputs.

c) Transportation alcohol consumption reported in Table 3-9.

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TABLE 1-14: REVISED WBS NO FURTHER ACTION CASE--TRANSPORTATION SECTOR DATA AND ASSUMPTIONS

YEAR	HIGHWAY VEHICLES							
	PASSENGER				FREIGHT			
	OPERATING VEHICLES (MILLION)	TOTAL VEHICLE MILES (BILLION)	ROAD MPG	OPERATING VEHICLES (MILLION)	TOTAL VEHICLE MILES (BILLION)	ROAD MPG	OPERATING VEHICLES (MILLION)	TOTAL VEHICLE MILES (BILLION)
EST. 1985	144.1	1495	17.1	23.1	292	9.0	139.9	1521
EST. 1987	156.8	1691	18.3	24.1	306	9.4	151.6	1747
PROJ. 1990	164.9	1764	18.8	25.1	313	8.4	190.0	2077
1995	176.0	1942	20.0	27.3	355	8.7	203.3	2297
2000	192.4	2167	20.5	29.3	402	9.2	221.7	2549
2005	207.2	2395	20.6	31.5	450	9.4	238.7	2845
2010	221.1	2662	20.8	33.6	507	9.5	254.6	3168
2015	232.5	2895	21.7	35.6	565	9.7	268.1	3460
2020	240.7	3062	22.3	37.5	612	9.9	278.2	3674
2025	247.7	3163	22.6	39.4	663	10.2	287.1	3826
2030	254.8	3194	22.9	41.2	723	10.3	296.1	3918

a) Some historical data are from the Monthly Energy Review and are not directly comparable with data underlying the projections due to definitional differences.

YEAR	GROWTH RATES (% PER YEAR)							
	OPERATING VEHICLES	TOTAL VEHICLE MILES	ROAD MPG	OPERATING VEHICLES	TOTAL VEHICLE MILES	ROAD MPG	OPERATING VEHICLES	TOTAL VEHICLE MILES
1987-1990	1.76	1.46	1.00	1.46	0.76	-3.66	7.56	5.86
1990-1995	1.36	1.96	1.24	1.66	2.56	0.76	1.46	2.06
1995-2000	1.86	2.06	0.54	1.46	2.56	1.06	1.76	2.16
2000-2005	1.56	2.26	0.14	1.56	2.26	0.46	1.56	2.26
2005-2010	1.36	2.16	0.24	1.36	2.46	0.36	1.36	2.26
2010-2015	1.06	1.76	0.80	1.26	2.26	0.46	1.06	1.86
2015-2020	0.76	1.16	0.54	1.16	1.66	0.56	0.76	1.26
2020-2025	0.66	0.76	0.34	0.96	1.66	0.56	0.66	0.86
2025-2030	0.66	0.26	0.34	0.96	1.86	0.56	0.66	0.56

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TABLE 2-3: REVISED NES NO FURTHER ACTION CASE--ENERGY-RELATED CO₂ EMISSIONS IN THE U.S. ECONOMY 14-2000
(MILLION METRIC TONS OF CARBON PER YEAR)

CARBON DIOXIDE EMISSIONS ^{a)}																	
YEAR	ELECTRICITY PRODUCTION					SYNTHETIC FUELS PRODUCTION			END-USE FUELS CONSUMPTION ^{b)}				FUEL TOTALS				
	OIL	GAS	COAL	GEO-THERMAL	TOTAL	ALCOHOL	COAL	TOTAL	OIL	GAS	COAL	TOTAL	OIL	GAS	COAL	TOTAL	
HIST.																	
1960	11	26	106	0	143	0	0	0	357	147	86	590	369	173	192	0	734
1965	15	35	146	0	195	0	0	0	408	189	79	676	423	223	225	0	872
1970	43	59	182	0	283	0	0	0	493	246	61	800	536	305	243	0	1093
1975	64	47	221	1	332	0	0	0	532	231	42	805	596	278	263	1	1137
1980	53	55	304	1	414	0	0	0	554	233	38	825	607	288	342	1	1239
1985	22	46	365	2	434	0	1	3	524	205	43	772	546	251	409	2	1207
HIST.																	
1987	33	59	387	2	480	0	2	2	491	207	80	786	524	266	477	2	1268
PROJ.																	
1990	36	60	396	2	494	0	2	2	513	211	77	802	550	271	475	2	1299
1995	41	73	443	3	560	0	3	3	533	222	72	828	574	296	518	3	1391
2000	40	98	502	5	645	0	3	3	567	235	78	880	608	332	584	5	1529
2005	37	94	581	7	720	0	3	3	617	233	93	942	654	327	678	7	1666
2010	40	92	690	9	831	0	3	3	667	234	110	1011	707	326	804	9	1846
2015	51	106	790	12	959	0	3	3	711	228	121	1060	762	333	914	12	2022
2020	41	89	928	18	1076	0	3	3	751	223	123	1097	792	312	1055	18	2177
2025	35	82	1055	19	1192	0	3	3	788	223	124	1134	823	305	1182	19	2329
2030	24	63	1205	20	1312	0	4	4	817	218	124	1159	841	282	1332	20	2475

a) Table values are for carbon only. Multiply values by 44/12 to determine weight of carbon dioxide.

b) Including synthetic fuels and excluding non-energy feedstocks.

TABLE 2-2: PROVIDED WAS NO FURTHER ACTION CASE--ENERGY-RELATED CO2 EMISSIONS BY SECTOR (MILLION METRIC TONS OF CARBON PER YEAR)

- a) Table values are for carbon only. Multiply values by 44/12 to determine weight of carbon dioxide.
- b) Excluding non-energy feedstocks.
- c) Energy transformation and distribution losses (from electricity and synthetic fuels production), and electric vehicles.

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TABLE 2-3: REVISED MRS NO FURTHER ACTION CASE--ENERGY-RELATED SULFUR OXIDE AND NITROGEN OXIDE EMISSIONS 14-Dec
(THOUSAND TONS PER YEAR)

YEAR	SULFUR OXIDE EMISSIONS					NITROGEN OXIDE EMISSIONS				
	UTILITY	INDUSTRY	TRANSPORT	MRS. & COM.	OTHER	UTILITY	INDUSTRY	TRANSPORT	MRS. & COM.	OTHER
ESTI-1987	16150	5777	679	682	0	23288	7344	2765	6942	0
PROJ-1990	16420	5847	745	760	0	23712	7421	2621	6345	0
1995	12370	5528	760	670	0	19327	7433	2545	5018	0
2000	8886	5744	842	627	0	16099	7227	2754	5115	0
2005	6706	6589	933	592	0	14819	7489	3272	5628	0
2010	5975	7605	1028	557	0	15165	8186	3925	6250	0
2015	6466	8276	1117	533	0	16390	8853	4412	6752	0
2020	6252	8903	1193	514	0	16951	8875	4710	7109	0
2025	6118	9440	1240	499	0	17297	8945	4927	7411	0
2030	5906	9950	1298	489	0	17722	8986	5159	7716	0

a) This category includes emissions from coal liquification.

(BILLION U.S. POUNDS PER YEAR)

YEAR	SULFUR OXIDE EMISSIONS					NITROGEN OXIDE EMISSIONS				
	UTILITY	INDUSTRY	TRANSPORT	MRS. & COM.	OTHER	UTILITY	INDUSTRY	TRANSPORT	MRS. & COM.	OTHER
ESTI-1987	32.3	11.6	1.4	1.4	0.0	46.6	14.7	5.5	13.9	0.0
PROJ-1990	32.8	11.7	1.5	1.4	0.0	47.4	14.8	5.2	12.7	0.0
1995	24.7	11.1	1.5	1.3	0.0	38.7	14.9	5.1	10.0	0.0
2000	17.8	11.5	1.7	1.3	0.0	32.2	14.5	5.5	10.2	0.0
2005	13.4	13.2	1.9	1.2	0.0	29.6	15.0	6.5	11.3	0.0
2010	12.0	15.2	2.1	1.1	0.0	30.3	16.4	7.9	12.5	0.0
2015	12.9	16.6	2.2	1.1	0.0	32.8	17.7	8.8	13.5	0.0
2020	12.5	17.8	2.4	1.0	0.0	33.7	17.7	9.4	14.2	0.0
2025	12.2	18.9	2.5	1.0	0.0	34.6	17.9	9.9	14.9	0.0
2030	12.0	19.9	2.6	1.0	0.0	35.4	18.0	10.3	15.4	0.0

a) This category includes emissions from coal liquification.

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TABLE 2-1: REVISED MRS NO FORTIER ACTIO 14-Dec
METHANE EMISSIONS
(MILLION METRIC TONS)

YEAR	COAL MINING			NATURAL GAS LEAKS	TOTAL
	UNDER- GROUND	SURFACE	TOTAL		
ESTI. 1987	2.1	0.2	2.4	6.5	8.9
PROJ. 1990	2.4	0.2	2.6	6.7	9.3
1995	2.9	0.2	3.1	7.3	10.4
2000	3.7	0.2	3.9	8.2	12.1
2005	4.7	0.2	4.9	8.1	13.0
2010	6.0	0.2	6.2	8.1	14.3
2015	6.8	0.3	7.1	8.3	15.4
2020	7.2	0.4	7.6	7.8	15.4
2025	7.1	0.5	7.6	7.6	15.2
2030	6.9	0.6	7.6	7.0	14.6

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TABLE 3-1: REVISED NES NO FURTHER ACTION CASE--U.S. ELECTRIC UTILITY AND NON-UTILITY CAPABILITY AND GENERATION
FOSSIL TECHNOLOGIES

14-500

NET SUMMER GENERATING CAPABILITY (GW) ^{a)}																			
YEAR	OIL			GAS							COAL						TOTAL NUCLEAR	TOTAL HYDRO.	TOTAL
	OIL STEAM	OIL COMBOS. TURBINE	TOTAL OIL	GAS STEAM	GAS COMB. CYCLES	GAS STIG/ ISTIG	GAS COMBOS. TURBINE	GAS FUEL CELLS	OTHER TURBINE	TOTAL GAS	POLY. ^{b)} COAL	b) AFS	b) IACC	COAL ISTIG	NEW COAL TECH.	TOTAL COAL			
1971	n/a	n/a	n/a	n/a	0.0	0.0	n/a	-	-	n/a	n/a	0.0	0.0	-	-	n/a	37.2	n/a	n/a
1975	n/a	n/a	n/a	n/a	0.0	0.0	n/a	-	-	n/a	n/a	0.0	0.0	-	-	n/a	51.7	n/a	n/a
1980	31.3	23.4	76.9	97.1	0.0	0.0	23.1	-	-	120.2	206.9	0.0	0.0	-	-	206.9	79.6	51.4	634.0
1983	49.9	26.3	76.2	95.5	0.0	0.0	22.7	-	-	118.2	293.1	0.0	0.0	-	-	293.1	93.2	95.3	676.0
1987	51.9	20.8	72.7	92.2	13.7	0.0	25.4	0.0	0.0	131.2	298.4	0.0	0.0	0.0	0.0	298.4	99.3	102.0	704.3
1990	44.2	24.2	68.4	88.5	34.4	0.3	29.6	0.0	0.1	152.9	306.4	0.0	0.0	0.0	0.0	306.4	102.8	116.0	746.5
1995	39.5	31.5	70.9	83.1	62.6	13.5	38.4	0.2	0.5	198.3	312.5	6.5	0.9	0.0	0.0	322.2	103.7	129.4	815.3
2000	38.7	36.3	75.0	77.5	64.1	21.3	44.4	1.1	2.0	210.4	325.2	23.6	7.9	0.0	0.0	377.0	103.8	134.1	900.3
2010	38.0	39.2	77.2	75.9	44.9	25.9	47.9	1.7	4.2	199.5	336.8	38.6	17.5	0.0	0.0	440.1	90.9	161.5	957.3
2015	37.7	42.4	80.1	70.2	31.5	32.4	51.0	2.9	0.8	197.6	335.1	61.0	39.7	0.0	0.0	507.6	68.2	159.5	1009.1
2020	32.6	45.5	78.1	60.5	24.9	36.1	55.7	4.1	14.2	195.4	313.1	107.8	95.5	0.0	0.0	603.6	53.6	179.3	1110.0
2025	26.0	46.9	72.9	48.3	21.2	37.0	57.4	4.7	17.7	186.3	282.9	150.0	113.0	0.0	0.0	693.0	26.0	206.4	1105.3
2030	19.0	44.9	64.7	36.7	18.0	36.6	54.9	5.0	20.1	172.0	256.3	213.8	123.3	0.0	0.0	797.9	5.7	233.3	1273.6

1975-1976	ELECTRICITY GENERATION (THOUSAND GWH) a)																			
	3	209	288	0	0	12	-	-	-	300	833	0	0	0	-	-	833	173	0	1615
1976	3	246	326	0 <td>0<td>20</td><td>-</td><td>-</td><td>-</td><td>346</td><td>1162</td><td>0<td>0<td>0<td>-</td><td>-</td><td>1162</td><td>251</td><td>0<td>2005</td></td></td></td></td></td>	0 <td>20</td> <td>-</td> <td>-</td> <td>-</td> <td>346</td> <td>1162</td> <td>0<td>0<td>0<td>-</td><td>-</td><td>1162</td><td>251</td><td>0<td>2005</td></td></td></td></td>	20	-	-	-	346	1162	0 <td>0<td>0<td>-</td><td>-</td><td>1162</td><td>251</td><td>0<td>2005</td></td></td></td>	0 <td>0<td>-</td><td>-</td><td>1162</td><td>251</td><td>0<td>2005</td></td></td>	0 <td>-</td> <td>-</td> <td>1162</td> <td>251</td> <td>0<td>2005</td></td>	-	-	1162	251	0 <td>2005</td>	2005
1977	3	100	279	0 <td>0<td>13</td><td>-</td><td>-</td><td>-</td><td>292</td><td>1402</td><td>0<td>0<td>0<td>-</td><td>-</td><td>1402</td><td>384</td><td>293</td><td>2471</td></td></td></td></td>	0 <td>13</td> <td>-</td> <td>-</td> <td>-</td> <td>292</td> <td>1402</td> <td>0<td>0<td>0<td>-</td><td>-</td><td>1402</td><td>384</td><td>293</td><td>2471</td></td></td></td>	13	-	-	-	292	1402	0 <td>0<td>0<td>-</td><td>-</td><td>1402</td><td>384</td><td>293</td><td>2471</td></td></td>	0 <td>0<td>-</td><td>-</td><td>1402</td><td>384</td><td>293</td><td>2471</td></td>	0 <td>-</td> <td>-</td> <td>1402</td> <td>384</td> <td>293</td> <td>2471</td>	-	-	1402	384	293	2471
1978	3	118	258	0 <td>0<td>15</td><td>-</td><td>-</td><td>-</td><td>273</td><td>1464</td><td>0<td>0<td>0<td>-</td><td>-</td><td>1464</td><td>435</td><td>287</td><td>2597</td></td></td></td></td>	0 <td>15</td> <td>-</td> <td>-</td> <td>-</td> <td>273</td> <td>1464</td> <td>0<td>0<td>0<td>-</td><td>-</td><td>1464</td><td>435</td><td>287</td><td>2597</td></td></td></td>	15	-	-	-	273	1464	0 <td>0<td>0<td>-</td><td>-</td><td>1464</td><td>435</td><td>287</td><td>2597</td></td></td>	0 <td>0<td>-</td><td>-</td><td>1464</td><td>435</td><td>287</td><td>2597</td></td>	0 <td>-</td> <td>-</td> <td>1464</td> <td>435</td> <td>287</td> <td>2597</td>	-	-	1464	435	287	2597
1979	3	130	231	50 <td>0<td>5<td>0<td>0<td>0</td><td>286</td><td>1569</td><td>0<td>0<td>0<td>0<td>0</td><td>1569</td><td>546</td><td>317</td><td>2849</td></td></td></td></td></td></td></td></td>	0 <td>5<td>0<td>0<td>0</td><td>286</td><td>1569</td><td>0<td>0<td>0<td>0<td>0</td><td>1569</td><td>546</td><td>317</td><td>2849</td></td></td></td></td></td></td></td>	5 <td>0<td>0<td>0</td><td>286</td><td>1569</td><td>0<td>0<td>0<td>0<td>0</td><td>1569</td><td>546</td><td>317</td><td>2849</td></td></td></td></td></td></td>	0 <td>0<td>0</td><td>286</td><td>1569</td><td>0<td>0<td>0<td>0<td>0</td><td>1569</td><td>546</td><td>317</td><td>2849</td></td></td></td></td></td>	0 <td>0</td> <td>286</td> <td>1569</td> <td>0<td>0<td>0<td>0<td>0</td><td>1569</td><td>546</td><td>317</td><td>2849</td></td></td></td></td>	0	286	1569	0 <td>0<td>0<td>0<td>0</td><td>1569</td><td>546</td><td>317</td><td>2849</td></td></td></td>	0 <td>0<td>0<td>0</td><td>1569</td><td>546</td><td>317</td><td>2849</td></td></td>	0 <td>0<td>0</td><td>1569</td><td>546</td><td>317</td><td>2849</td></td>	0 <td>0</td> <td>1569</td> <td>546</td> <td>317</td> <td>2849</td>	0	1569	546	317	2849
1980	9	192	368	160 <td>1</td> <td>11</td> <td>0<td>0<td>0</td><td>540</td><td>1633</td><td>0<td>0<td>0<td>0<td>0</td><td>1633</td><td>558</td><td>375</td><td>3298</td></td></td></td></td></td></td>	1	11	0 <td>0<td>0</td><td>540</td><td>1633</td><td>0<td>0<td>0<td>0<td>0</td><td>1633</td><td>558</td><td>375</td><td>3298</td></td></td></td></td></td>	0 <td>0</td> <td>540</td> <td>1633</td> <td>0<td>0<td>0<td>0<td>0</td><td>1633</td><td>558</td><td>375</td><td>3298</td></td></td></td></td>	0	540	1633	0 <td>0<td>0<td>0<td>0</td><td>1633</td><td>558</td><td>375</td><td>3298</td></td></td></td>	0 <td>0<td>0<td>0</td><td>1633</td><td>558</td><td>375</td><td>3298</td></td></td>	0 <td>0<td>0</td><td>1633</td><td>558</td><td>375</td><td>3298</td></td>	0 <td>0</td> <td>1633</td> <td>558</td> <td>375</td> <td>3298</td>	0	1633	558	375	3298
1981	14	190	371	307	66	17	1	0 <td>0</td> <td>761</td> <td>1813</td> <td>41</td> <td>6</td> <td>15</td> <td>0<td>0</td><td>1875</td><td>573</td><td>401</td><td>3799</td></td>	0	761	1813	41	6	15	0 <td>0</td> <td>1875</td> <td>573</td> <td>401</td> <td>3799</td>	0	1875	573	401	3799
1982	18	175	315	305	101	22	5	2	749	1903	149	50	128	0 <td>0</td> <td>0</td> <td>2230</td> <td>591</td> <td>472</td> <td>4217</td>	0	0	2230	591	472	4217
1983	22	187	329	225	132	27	7	3	723	2033	245	111	301	0 <td>0</td> <td>0</td> <td>2690</td> <td>594</td> <td>500</td> <td>4693</td>	0	0	2690	594	500	4693
1984	24	238	397	190	196	30	12	7	831	2027	393	252	451	0 <td>0</td> <td>0</td> <td>3123</td> <td>418</td> <td>564</td> <td>5173</td>	0	0	3123	418	564	5173
1985	27	189	302	142	205	32	17	12	710	1894	684	554	606	0 <td>0</td> <td>0</td> <td>3738</td> <td>329</td> <td>669</td> <td>5634</td>	0	0	3738	329	669	5634
1986	27	162	250	125	218	33	20	15	662	1715	1002	882	717	0 <td>0</td> <td>0</td> <td>4315</td> <td>165</td> <td>763</td> <td>6067</td>	0	0	4315	165	763	6067
1987	28	107	146	102	199	34	21	18	519	1556	1355	1296	781	0 <td>0</td> <td>0</td> <td>4989</td> <td>35</td> <td>851</td> <td>6500</td>	0	0	4989	35	851	6500

- a) Does not include industrial cogeneration for own use; generation does not include transmission and distribution losses.
b) Includes life-extended and repowered facilities.
c) Represents a phased construction of the technology. A gasifier is added when it becomes economical to do so.
d) Consists of gas turbines used in conjunction with renewable technologies to provide load leveling.

TABLE 3-2: REVISED NIS NO FURTHER ACTION CASE--U.S. ELECTRIC UTILITY AND NON-UTILITY CAPABILITY AND GENERATION 14-000

NUCLEAR AND RENEWABLE TECHNOLOGIES

[illegible]

a) Does not include industrial cogeneration for own use.

b) Net summer capability for hydroelectric power exceeds its nameplate capacity by about 15 to 25 percent.

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TABLE 3-3: REVISED NIS NO FURTHER ACTION CASE--U.S. ELECTRIC LIFE-EXTENDED AND REPOWERED CAPABILITY AND GENERATION

YEAR	NET SUMMER GENERATING CAPABILITY (GW)					ELECTRICITY GENERATION (THOUSAND GWS)						
	OIL STEAM	GAS STEAM	POLY. COAL	AFS	IOCC	TOTAL	OIL STEAM	GAS STEAM	POLY. COAL	AFS	IOCC	TOTAL
EXIST.												
1975	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0
1980	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0
1985	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0
EXTI.												
1987	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0
PROJ.												
1990	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0
1995	3.2	6.3	23.3	0.0	0.0	32.7	13	26	125	0	0	165
2000	17.2	36.1	118.7	0.0	0.0	171.9	76	161	703	0	0	940
2005	30.7	61.4	199.6	0.0	0.0	291.6	124	249	1150	0	0	1532
2010	35.6	71.1	234.3	0.0	0.0	341.1	155	309	1393	0	0	1857
2015	37.0	60.9	242.1	0.0	0.0	347.9	209	309	1439	0	0	2037
2020	32.3	60.0	225.9	0.0	0.0	318.2	161	299	1341	0	0	1802
2025	25.9	48.1	196.9	0.0	0.0	270.9	136	249	1169	0	0	1552
2030	19.7	36.5	167.9	0.0	0.0	224.1	78	145	996	0	0	1219